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Volume 5 | August, 1952 | Number 1

CONTENTS

X-Ray Diagnosis of Some Common Functional Foot Disorders, Including an Original Diagnostic Method for Determining Talar Rotation.
W. L. Tanenbaum, D.O., M.Sc., F.A.O.C.R., Philadelphia 3

Tumors of the Posterior Mediastinum.
A. G. Reed, B.S., D.O., Tulsa, Okla. 7

Radiation Therapy in Diseases of Childhood.
C. A. Tedrick, D.O., F.A.O.C.R., Phoenix, Ariz. 11

Minimal Pulmonary Tuberculosis.
Malcolm Snell, D.O., Dallas, Tex. 14

The Chest in Geriatrics.
W. V. Boudette, D.O., F.A.O.C.R., Dayton, Ohio 17

Renal Tumors with Special Reference to the Differential Diagnosis.
Edward P. Small, Jr., B.S., D.O., Detroit 19

X-Ray Diagnosis of Some Common Functional Foot Disorders, Including an Original Diagnostic Method for Determining Talar Rotation

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INTRODUCTION

The indiscriminate and empirical prescribing of "arch supports," both by physicians and by nonprofessionals in this scientific era of medicine, prompted the writer to undertake an investigation of the problem of functional foot disorders. Andrew Taylor Still, the founder of osteopathy, maintained and proved that altered balance and structure resulted in altered function. Dudley Morton[1] and Carter Harrison Downing[2] have made contributions to research and literature emphasizing the importance of the human foot and its relationship to weight distribution and body poise. Russel R. Peckham[3] wrote on the basic principles of foot mechanics. His reference to the talocalcaneal relationship and its effect on foot balance has been the basis for modern research and diagnosis in this field.

PURPOSE

This paper will endeavor to present a roentgen approach for the diagnosis of pes planus and pes cavus based on osteopathic principles. Organic and traumatic bone and joint diseases will not be considered at this time. The effect of talar rotation is reflected in problems originating in the hindfoot.

The conditions to be considered are: (1) Congenital short first metatarsal and (2) talar rotation. They constitute, in the writer's opinion, the most common causes of functional foot problems. They can only be diagnosed accurately by x-ray examination. Measurement of the degree of talar rotation is possible by this method. It is the hope of the writer that members of the osteopathic profession will evaluate this method and report their results.

CONGENITAL SHORT FIRST METATARSAL

Congenital short first metatarsal is considered by authorities to be the cause of the greatest percentage of forefoot problems. Morton[1] has shown by clinical evaluation, research, and experimentation that a congenital short first metatarsal will always alter the distribution of weight in the foot and many produce metatarsalgia. Bingham,[4] while stationed at the orthopedic clinic of the station hospital at Camp Van Dorn, Mississippi, found that of 10,000 soldiers examined there, 332 had painful feet. He also noted that 34 cases had congenital short first metatarsals. The most common complaints and symptoms are listed as follows in order of frequency:

1. Metatarsalgia
2. Callus under second and third metatarsal heads
3. Foot fatigue
4. Arch (longitudinal) pains
5. Leg pains (muscular)
6. Backache.

Congenital short first metatarsal may exist without symptoms until middle life. X-ray examination will show hypertrophic changes such as shaft enlargement and thickening of the cortex of the second metatarsal. These are compensatory factors due to the increased weight borne by this bone.

Children may develop an osteochondrosis involving the second metatarsal head epiphysis, known as Freiberg's infraction. Children with this condition suffer a great deal of pain and may develop a deformed bone and joint as a result of the disease. Anatomic variation in the length of the first metatarsal is a precursor to this joint pathology.

In hallux valgus the presence of a shortened first metatarsal is a common finding. The sesamoids are displaced and, as a rule, degenerative changes occur in the head of the first metatarsal. Pararthritic changes of hallux valgus are well known to all osteopathic physicians. Hallux rigidus, which is a degenerative arthritis of the first metatarsophalangeal articulation, may also be associated with and result from the anatomic shortening of the first metatarsal.

The diagnosis of the congenital short first metatarsal and its associated changes can be made from a dorsoplantar roentgenogram of the feet taken with the patient standing. This topic will be discussed further in the portion of this paper devoted to technical methods for x-ray diagnosis.

TALAR ROTATION

While the subject of talar rotation is not new to the osteopathic profession, its significance has not been fully expounded in the study of pes planus and pes cavus. My interest in this condition was stimulated in 1940 while in the podiatry clinic of the Osteopathic Hospital of Philadelphia. Dr. George Rothmeyer, with whom I was associated, stressed the importance of the calcaneal twist in pes planus and pes cavus. It was noted that the so-called sprained ankle usually was associated with functional disorders of the foot.

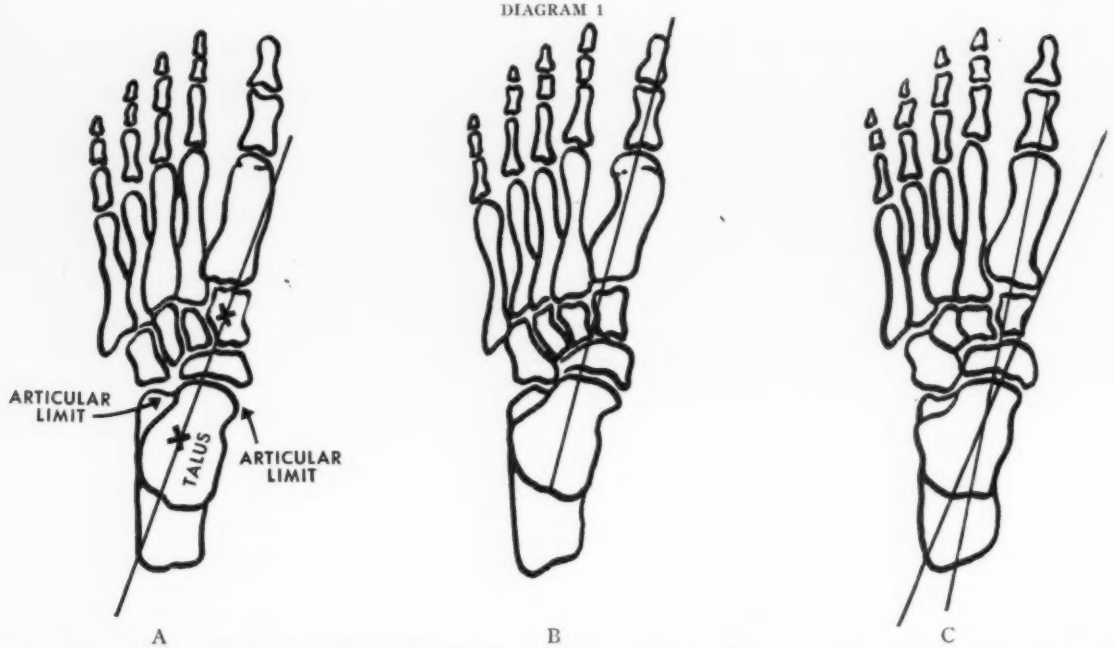
Russel R. Peckham[3] noted that the chief motion between the talus and calcaneus is rotation. He also noted that altered joint mechanics of these bones disturbed the coordination and accommodation of the medial and lateral arches of the foot. Anatomically, the sustentaculum tali helps maintain the balance of the talus. It serves as an attachment for the talonavicular ligament which is strengthened by the calcaneonavicular ligament. These structures affect the so-called medial arch which acts as a shock absorber.

In the condition known as pes planus or "low arch" the calcaneus rotates medially, lowering the sustentaculum tali. The talus follows in the same direction by rotation. The foot and ankle are then unbalanced and in a state of stress and strain. The physical finding of fullness of the medial arch is caused by the lowered navicular or talar head and the adjacent soft tissues. This condition is commonly known as pes planus or flatfoot.

When the opposite or "high arch" exists the reverse is found to exist. The calcaneus rotates on its long axis to the lateral side, elevating the sustentaculum tali, and the talus also rotates on its long axis to the lateral side. There is then an elevation of the navicular and medial arches, resulting in the so-called high arch or pes cavus. This does not refer to pes cavus associated with organic disease.

In this paper pes planus or "low arch" will be referred to as medial talar rotation and pes cavus or

DIAGRAM 1



"high arch" as lateral talar rotation. These terms describe the x-ray findings of these conditions.

TECHNICAL METHODS FOR X-RAY DIAGNOSIS

The radiographs are made with the shoes off and the patient standing as suggested by Gamble[5] and Morton.[1] I have added the following modifications: 36 inch distance and angle of tube parallel to the dorsum of the forefoot and centered between both feet at the position of the talonavicular articulation. The patient stands on the film or cassette in a natural weight-bearing position similar to that accepted for the erect weight-bearing study of the pelvis and lumbar spine. The cassette or cardboard film holder may be placed on the floor for adults and on the table for children. A special stand is obtainable from the Ritter Company for this study. I feel that the medial lateral studies may be done in the recumbent position with the foot at right angles to the leg. If the Ritter device is used, the lateral exposure is made in the standing position.

If the film used is of the nonscreen type the average exposure for adults is 75 milliampere-seconds at 45 Pkv.; in a cassette with screens (par speed) and regular film, 10 milliampere-seconds and 40 Pkv. will produce good roentgenograms.

Fig. 1

Male, aged 44

X-ray findings:
Right—no abnormal rotation
Left—no abnormal rotation
No abnormal metatarsal shortening

Fig. 2

Male, aged 10

X-ray findings:
Right—9 degrees of internal rotation of the talus
Short first metatarsal
Left—no abnormal rotation
Short first metatarsal

Diagnosis:
Congenital short first metatarsal, bilaterally
First degree pes planus, right

Fig. 3

Female, aged 50

X-ray findings:
Right—15 degrees of internal rotation of talus
Short first metatarsal
Left—7 degrees of internal rotation of the talus
Short first metatarsal

Diagnosis:
Second degree pes planus, right
First degree pes planus, left
Congenital short first metatarsal, bilaterally

Fig. 4

Female, aged 34
X-ray findings:
Right—12 degrees of internal rotation of talus
Short first metatarsal
Left—16 degrees of internal rotation of the talus
Short first metatarsal
Diagnosis:
Second degree pes planus, right
Third degree pes planus, left
Congenital short first metatarsal, bilaterally

Fig. 5

Male, aged 43
X-ray findings:
Right—20 degrees of internal talar rotation
Left—20 degrees of internal talar rotation
Minimal shortening of first metatarsal, bilaterally
Diagnosis:
Third degree pes planus, bilaterally

Fig. 6

Male, aged 8
X-ray findings:
Right—23 degrees of internal talar rotation
Left—20 degrees of internal talar rotation
Diagnosis:
Fourth degree pes planus, right
Third degree pes planus, left

The dorsoplantar position is used for measurement of both the congenital short first metatarsal and the degree of talar rotation.

Congenital Short First Metatarsal.—In the diagnosis of congenital short first metatarsals the dorsoplantar projection is most informative. On the radiograph a bisector of the second metatarsal is drawn by joining the mid-points of the head and base. At right angles or perpendicular to this line through the mid-point of the second metatarsal head a second line is drawn in the direction of the first metatarsal. If this second line falls in front of the first metatarsal, this bone should be considered as short or insufficient. Morton[1] describes the various degrees which may occur.

Talar Rotation.—The radiographs for diagnosis of congenital short first metatarsal are also used in diagnosis of talar rotation. The standing dorsoplantar radiograph is marked as follows: The head of the talus is outlined and the two extreme articular limits marked with compass points. The compass is then placed on each of these points and the common bisector of the talar head and neck is determined (Diagram 1A). A second line is made by joining the mid-points of the first metatarsal head and base (Diagram 1B). Both lines are extended until they cross and form an angle (Diagram 1C). The angle formed is measured by a protractor. When the lines do not cross, the foot may be considered as normal insofar as talar rotation is concerned.

External rotation of the talus exists when the talar bisector crosses the first metatarsal bisector to the lateral side. Internal rotation is present when the reverse is found and the talar bisector crosses the first metatarsal bisector on the medial side. This technic of x-ray diagnosis can be utilized at any age since the talus and calcaneus are demonstrable roentgenographically at birth.

The degree of rotation of the normal foot was determined from x-ray examinations of a control series of twenty-five patients of all ages with no apparent calcaneal twist or symptoms referable to the feet. The abnormal degrees of rotation were determined by correlating physical and x-ray findings on 100 patients.

The following table shows the type and degree of talar rotation.

TABLE I. TALAR ROTATION

Rotation	Degrees
External (Pes Cavus)	
Normal	0 to — 5
First degree	— 6 to —10
Second degree	—11 to —15
Third degree	—16 to —20
Fourth degree	—21 and over
Internal (Pes Planus)	
Normal	0 to + 5
First degree	+ 6 to +10
Second degree	+11 to +15
Third degree	+16 to +20
Fourth degree	+21 and over

Note: Minus signs are used to designate external (lateral) rotation and plus signs to designate internal (medial) rotation.

It is important to know the degree of rotation so that the amount of wedging needed can be determined accurately and individually. Many of the patients seen have had external rotation of one talus and internal rotation of the other. Very few show the same degree of rotation bilaterally, as can be noted by the included series of x-rays (Figs. 1-12). Recheck examinations with corrections were done and the results warranted continual use of this method of treatment.

CONCLUSION

The writer has endeavored to present the essentials for x-ray diagnosis of some common functional foot disorders. The purpose is to make it possible to individualize treatment in the same way as the erect posture film of the spine has made it possible to individualize lift therapy. Both examinations may be done at the same time. It is the hope of the writer that empirical therapy and indiscriminate prescribing of arch supports and orthopedic shoes will be replaced

Fig. 7

Female, aged 45
X-ray findings:
Right—24 degrees of internal rotation of the talus
Minimal shortening of first metatarsal
Left—21 degrees of internal rotation of the talus
Minimal shortening of first metatarsal
Diagnosis:
Fourth degree pes planus, bilaterally

Fig. 8

Female, aged 30
X-ray findings:
Right—8 degrees of external talar rotation
Short first metatarsal
Left—7 degrees of internal talar rotation
Short first metatarsal
Diagnosis:
First degree pes cavus, right
First degree pes planus, left
Congenital short first metatarsal, bilaterally

Fig. 9

Female, aged 38
X-ray findings:
Right—6 degrees of external talar rotation
Left—10 degrees of external talar rotation
Hammer toe—second toe
Diagnosis:
First degree pes cavus, bilaterally

by logical and accurate prescription as a means to re-establish foot balance.

The conservative approach to management of functional foot disorders can now be utilized by every physician. The x-ray method of diagnosis merely improves the accuracy of the application of the basic principles of diagnosis so well known in the osteopathic profession.

SUMMARY

1. Simplified methods of x-ray diagnosis of the most common causes of functional foot disorders have been discussed.

2. An original method of diagnosis to determine the degree of talar rotation is presented for evaluation. It is based on established osteopathic principles.

3. It has been pointed out that diagnostic findings obtained by x-ray examination make possible a scientific individualized approach to functional foot disorders.

149 Pelham Rd.

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Fig. 10

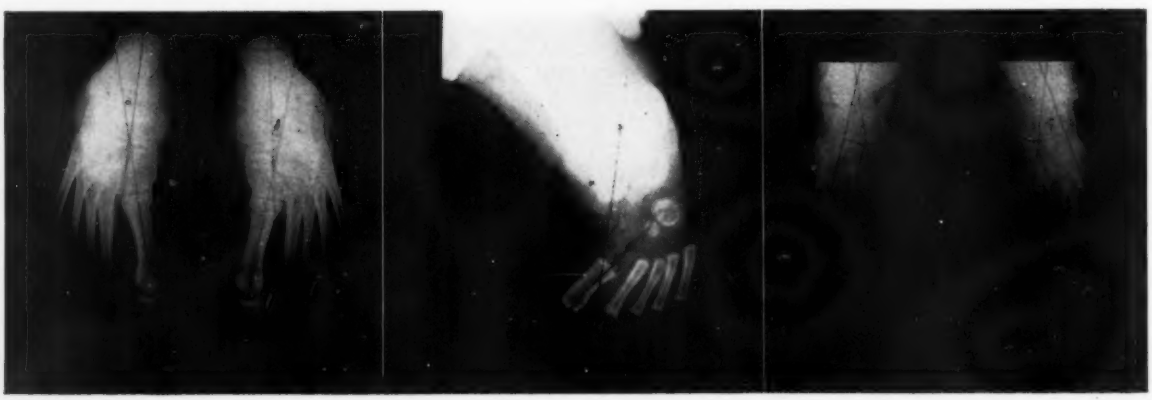
Male, aged 35 X-ray findings:
Right—16 degrees of external talar rotation
Left—13 degrees of external talar rotation
Diagnosis:
Third degree pes cavus, right
Second degree pes cavus, left

Fig. 11

Female, aged 14 months
X-ray findings:
Left—37 degrees of external talar rotation
Diagnosis:
Fourth degree pes cavus, left (early talipes)

Fig. 12

Male, aged 49
X-ray findings:
Right—27 degrees of external talar rotation
Left—22 degrees of external talar rotation
Diagnosis:
Fourth degree pes cavus, bilaterally



Tumors of the Posterior Mediastinum*

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INTRODUCTION

The posterior mediastinum is situated between the posterior pericardium and lung roots anteriorly, the spine posteriorly, the parietal pleura laterally, and the diaphragm inferiorly. For purposes of discussion the space also includes the superior mediastinum, since both divisions are essentially continuous with reference to pathways of structures.

The posterior mediastinal space contains the esophagus, trachea, and the main bronchi, the thoracic portion of the descending aorta and its intercostal branches, thoracic duct, dorsal lymphatic nodes, azygos and hemiazygos veins, and the spinal, intercostal, and sympathetic nerves. The very nature and arrangement of these structures determine largely the course and distribution of inflammatory processes, infections, and neoplasms.

Primary tumors appearing in the posterior mediastinum are benign or malignant and of metastatic or embroyonic origin. Limitation of space compels the selection for discussion only of those structures and their new growths that are considered relatively important.

POSTERIOR DORSAL LYMPH NODES

The two chief types of neoplasms of the posterior mediastinal glands are lymphadenoma and lymphosarcoma.

Lymphadenoma may be due to many factors, including influenzal pneumonias and other acute respiratory infections, neoplasms, tuberculosis, and pneumoconiosis. The commonest cause in young children is primary tuberculosis. Stated conversely, it is true, that detectable glandular enlargement from nontuberculous infections in children is exceptional. A negative Mantoux reaction aids in differentiation. Gross enlargement often is seen in metastatic lesions, including sympathicoblastoma.

While in adults the commonest cause of glandular enlargements is lymphoblastoma, the paratracheal group is reported to be first affected by lymphadenoma.

Roentgen images of lymphadenomatous nodes are often obscured by the heart and lung root vessels. However, if the tracheobronchial glands are sufficiently hypertrophied or if calcified they become demonstrable. Differentiation, according to Paull,[1] must be made from tuberculosis, coccidioidosis, lymphoblastoma, and metastases.

Lymphosarcoma is a malignancy of lymph glands. After penetrating the capsules the nodes become apparently fused. Histologically three classes are recognized: the small-celled lymphocytoma, which is rare and is found in the very young; the large-celled (reticulum cell) sarcoma, and the giant follicular lymphadenopathy.

Sarcomatous tumors grow with great rapidity, involving different groups of glands with indifferent sequence until the mediastinal space is filled and the lungs invaded. Compression symptoms may not occur until late, followed quickly by general weakness and progressive loss of weight.

Roentgenologic differentiation between lymphoblastoma and lymphosarcoma is not possible. Size of nodules according to Vieta and Craver's[2] series is of no value. Distinction can be made from aneurysm if the nodules are not large, since the aorta is usually seen lateral to or within the tumor shadow. Later the aorta may be completely incorporated within the mass. Massive involvement of the pleura is an accepted feature.

Lymphosarcoma is radiosensitive; x-ray is the therapy of choice. Results are usually dramatic and palliative.

Other involvements of the posterior mediastinal lymph glands include lymphatic leukemia, myelogenous leukemia, and mycosis fungoides.

In lymphatic leukemia often the hilar glands are too small to be visualized. Miliary dissemination is exceptional, while isolated, round leukemic foci may appear. Roentgen therapy is effective, as reported by Bethell[3] and Vieta and Craver.[2]

Infiltration of small mediastinal glands is characteristic of myelogenous leukemia. Rarely a demonstrable tumor, roentgenologically, is present. Only 9.6 per cent showed enlarged hilar nodes in Vieta and Craver's series, while 13 per cent showed miliary nodes.

In mycosis fungoides only 1 out of 10 cases revealed a mediastinal mass. Three had parenchymal pathology similar to that seen in lymphosarcoma.

TUMORS OF THE ESOPHAGUS

Tumors of the esophagus may be benign or malignant. The malignant group may be primary or result from invasion. They are said to occur at the most constricted areas.

Benign tumors are rather rare and are frequently asymptomatic. They may be intramural or intraluminal and occur most often in the upper one-fourth of the esophagus as pedunculated fibromas, myomas, or lipomas. Symptoms are those of esophageal obstruction. Regurgitation of an elongated pedunculated tumor is not unusual and may well establish its diagnosis. If suddenly aspirated, asphyxia and consequent death may occur. Smaller tumors are seldom recognized. Rarely do benign esophageal neoplasms undergo malignant degeneration. When large they obstruct the lumen and become ulcerated with secondary infection.

Carcinoma of the esophagus ranks seventh in frequency in males. It occurs in 20 per cent of all gastrointestinal malignancies. Guisez[4] found in a study of 565 cases the ratio of incidence was 5 men to 1 woman. In Pillmore's[5] series it was 9 to 1. The average age level is from 40 to 70 years.

Oschner[6] in a series of 8,572 cases found that 20 per cent developed in the upper third, 37 per cent in the middle third, and 43 per cent in the lower third of the esophagus. From these areas metatastic spread may occur.

Early recognition of neoplasms of the esophagus is unusual. Among the earliest symptoms and signs

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are epigastric distress, substernal pain, a feeling of fullness, discomfort, dull pressure, or burning sensation which radiates to the back of the zyphoid cartilage. The progress is slow. In due time dysphagia, described as a tightness or a lump in the throat is noted, first with solid foods only, but ultimately even with liquids. Hoarseness, due to pressure on the recurrent laryngeal nerve, is a comparatively late symptom of involvement of the upper thoracic or cervical portion. Progressive loss of weight is characteristic.

Diagnosis is by the roentgen ray, direct examination, biopsy of tissue and secretions, or by a combination of these methods. Roentgen recognition is the most reliable tentative diagnostic method relating to cancer of this structure. An irregular filling defect with dilatation above the obstruction is characteristic. Final diagnosis is dependent upon a biopsy specimen esophagoscopically removed.

Fluoroscopic examination with barium emulsion reveals the early lesion limited to a small area on the wall and producing a defective mucosal pattern. The condition must be differentiated from cicatrical tissue, cardiospasm, hiatal hernia, or ulceration. According to Kaplan,[7] the lesion appears as a flat infiltrating ulcer, bulky polypoid mass, or as a diffuse infiltration.

The most common type of malignancy of the esophagus is the epithelioma, located in the upper portion. It metastasizes early and is usually rather undifferentiated. Adenocarcinoma occurs in the lower third, often as an extension from the stomach.

Only about 100 cases of benign esophageal tumors have been reported in medical literature.[8] Invariably in roentgen examination of benign tumors the peristaltic waves pass through the tumor area which has not interfered with the elasticity of the esophageal wall. Barium flows smoothly and evenly around the tumor and on the opposite wall.

Differentiation must be made between esophageal malignancy and aortic aneurysm which usually pulsates; achalasia which occurs most frequently in younger individuals; varices in which the barium distribution appears beadlike, ragged, and moth-eaten; mediastinal cysts where the mucosal pattern is essentially unmodified; diverticula whose outlines are smooth; intrathoracic goiter which is usually anterior to the esophagus; and foreign bodies whose density or barium coated surfaces identify them.

Treatment of esophageal tumors comprises three methods. Guisez[4] states that in a selected group of cases long-time survivals have occurred following the meticulous use of radium. The attitude now prevails according to Ackerman and del Regato[8] that this is an unsatisfactory procedure because the modality is insufficiently controllable. However, Kaplan[7] and others insist that with the proper applicator radium or the implantation of radon seeds have a definite place in therapy.

Roentgen therapy is probably the method of choice, since cancer of the esophagus is a radiosensitive and radiocurable form of malignancy, according to Ackerman and del Regato.[8] Kaplan[7] is more conservative, insisting that lesions in the upper third are radiosensitive while those in the lower portion are quite radioresistant. Portmann[9] and others are still less optimistic.

Surgery, even with the most improved methods of thoracic approach, leaves much to be desired in the extirpation of esophageal cancer.

TUMORS OF THE TRACHEA

Tracheal tumors are comparatively rare. The lateral and posterior walls of the lower third of the trachea were most often involved in a series of twenty-seven cases reported by Portmann.[9]

Intratracheal tumors consist largely of papillomata, fibroma, and polypoid types. Primary carcinoma of the trachea is extremely infrequent.

Symptoms, as stated by Tinney, Moersch, and McDonald,[10] are dependent primarily upon mechanical factors, rather than the pathologic characteristics of the tumor itself. A tumor with a broad base extending into the lumen will give early respiratory symptoms. If the tumor is pedunculated it may act as a ball valve, obstructing the lumen in certain phases of the respiratory act. The cough is dry early but productive later, as a result of ulceration. Bleeding is a frequent symptom occurring in 44 per cent of the cases reported.

Diagnosis, roentgenographically, is difficult. Tomographic studies are often of value. Radiographs made following instillation of iodized oil into the trachea may successfully reveal the lesion.

Bronchoscopic observation is often an invaluable diagnostic method. Study of biopsy specimen and secretions determines the type.

Treatment of carcinoma or any tumor of the trachea is a difficult undertaking. Some authorities believe there is no surgical approach. Electrocoagulation is the modality of choice, according to Portmann[9] but not others. Radon seed implantation into the tumor is of doubtful value. Radium in special applicators has been used with varied results. Roentgen therapy may be of benefit, although these tumors are highly resistant to irradiation.

NEOPLASMS OF THE BRONCHI

Tumors of the bronchi are benign or carcinomatous, either primary or metastatic.

Benign neoplasms of the bronchi include adenomas, fibromas, myomas, lipomas, chondromas, and mixed tumors. The fact that sarcomatous degeneration occurs in a considerable number of benign tumors compels more than passing regard for these neoplasms.

Adenomas are the most common benign tumors of the bronchi. Of 355 bronchial tumors examined by Kramer and Som[11] 23 or 6 per cent were benign adenomas. They are much less common than malignant types. Originating in the mucous glands or their ducts they are either globular or pedunculated. They may originate in the bronchial wall and extend into the peribronchial tissue.

Adenomas are common to young individuals and mature females, in contradistinction to bronchogenic carcinomas which involve mostly aged males.

Cough and chest discomfort of moderate proportions usually prevail as early symptoms. Hemoptysis may be the only symptom for years. Asthmatic seizures are characteristic. When infection supervenes, profuse, foul expectoration and severe toxic symptoms may develop. The terminal picture may be that of chronic pneumonitis, bronchiectasis, or empyema.

Roentgen findings are not dissimilar to those of bronchogenic carcinoma. The adenomatous tumor, however, is freely movable, nonulcerated, and excessively vascular. Biopsy study fixes the diagnosis.

Primary tumors of the Bronchi.—Carcinoma of the bronchi is primarily a disease of males (5 to 1), from the fourth to the seventh decades. Young adults in the twenties and thirties are not immune. Some

authorities hold that pulmonary carcinomas arise only in the bronchi while others believe that some few arise from alveolar epithelium or pleural mesothelium. The site of bronchogenic cancers is intrabronchial, intramural, or extrabronchial.

Bronchogenic carcinoma is classified histologically into three types according to Shanks and Kerley:[12]

1. Squamous carcinoma, comprised of large cells which originate in the bronchial epithelium (Ewing)[13]

2. Columnar spheroidal-celled carcinoma which originates in the bronchial epithelium or mucous glands

3. Round-celled and oat-celled (Holmes and Schulz[14] and Shanks and Kerley[13]) or anaplastic tumors (Pillmore[5]) which have definite vascular systems and are highly malignant.

The origin of bronchial neoplasms is usually in the wall of a large bronchus which spreads to the adjacent hilar and mediastinal glands. Nodular growth into the lumen produces early bronchial stasis. Practically little distinction radiographically can be made of the different types.

The peribronchial lymphatics are invaded upon perforation of the bronchial wall, producing radiating strands in which nodules may be found. These lymph nodes appear in the roentgenogram as dense infiltration, circumscribed or diffuse, extending into the adjacent lung. The radiopacity may seem exaggerated due to atelectasis resulting from bronchial obstruction.

Stereoscopic, lateral, and oblique projections aid in delineating the mass, particularly in its relation to the chest wall and the heart. Fluoroscopy, kymography, and planigraphy aid in differentiating it from aneurysm and other masses. Instillation of iodized oil often renders the neoplasms more clearly discernible, as outlined by Adams and Davenport.[15] Bronchoscopy for securing biopsy tissue and secretions is an invaluable diagnostic procedure.

Emphysema due to trapped air is the first roentgenologic change visible if the tumor arises in the main stem bronchus. As the tumor obstructs further atelectasis may appear. Lung abscess may occur secondarily to a proximal bronchial block. In other instances the neoplasm may arise near the apex of the lung, showing homogenous increased density with marrowing of rib spaces and osteolytic bone changes. Other neoplasms may be confusing in the radiograph, but the nodular spread into the lung field is corroborative.

Differentiation between nodules of primary carcinoma and nodules metastastatic from an extrapulmonary malignancy is essential. The former are infiltrative in character, while the latter are usually multiple with smooth, sharp, and clear margins.

Primary bronchogenic neoplasms vary strikingly as to radioresistance. The oat-cell type is one of the most radiosensitive. Others are radioresistant, even to supervoltage therapy.

Surgery, when not contraindicated, is frequently the treatment of choice.

TUMORS OF NEUROGENIC ORIGIN

The most common neoplasms of the posterior mediastinum are of nerve origin. Neurogenic tumors originate from spinal, intercostal, and sympathetic nerves or ganglia and rarely from nerve elements within the intervertebral foramina. However, of the 101 cases collected from literature by Kent[16] eighteen instances of the latter type were encountered.

Rubin[17] states that a concise histological differentiation of neurogenic tumors is next to impossible, since they are frequently mixed with varied structures. It is known that in some neoplasms both benign and malignant portions may coexist.

For purposes of this discussion intrathoracic neurogenic tumors are divided into five classes. They include neurofibromas, neuroblastomas, hourglass tumors, ganglioneuromas, and neurofibromatosis.

Neurofibromas comprise a large percentage of the benign tumors of the posterior mediastinum. Usually high in the mediastinal space they originate from intercostal nerves appearing in the chest wall, the posterior roots, or spinal canal. Rarely do they become malignant. Pressure symptoms, and occasionally Horner's syndrome, characterize their occurrence.

The roentgenologic appearance of a neurofibroma is usually that of a rounded, dense, finely marginated mass, projecting into a lung field from the posterior mediastinum. Evidence is frequently present of erosion of bone walls of the intervertebral foramina, vertebral pedicles, posterior portions of the vertebral bodies, or heads of adjacent ribs. Depending upon the site of the tumor the interspace may be widened, or appears to be, as the result of paresis of the intercostal nerve with consequent relaxation of intercostal muscles.

Growth of the tumor is slow. Evidence of spinal compression depends upon the size of the included intraspinal portion. Erosion of bone is anatomically posterior to aortic aneurysm, with which it may be confused radiographically.

Neuroblastomas (neurocytomas) occur most frequently in infants and very young children. They are embroyonal neurogenic tumors which may originate in any part of the sympathetic system. Shanks and Kerley[12] state unequivocally that these tumors are highly malignant.

Growth of neuroblastoma is rapid. Metastasis occurs involving contiguous structures. Shanks and Kerley[12] believe that these neoplasms are rarely of the hourglass type and produce no bony changes in the spine. However, Pillmore[5] observes that skeletal metatastases in the skull and long bones are common.

Roentgenologic evidence varies from a smooth, small mass to a large, multilobular neoplasm. Differentiation must be made from malignant tumor of the ribs, sarcoma or secondary tumor which erodes by invasion, substernal thyroid, dermoid cyst, intrapulmonary tumor, and aneurysm of the aortic arch. In the last named, absence of pulsation is a strong differentiating feature.

Hourglass or dumbbell tumors arise from the posterior roots. They have an intraspinal and a larger extraspinal portion of variable dimensions connected by an isthmus through the intervertebral foramen. They are extrapleural and paravertebral or intercostal. Tangential views may reveal the pleural reflection over the slow growing mass. Evidence of spinal cord compression is noted if the intraspinal portion is sufficiently large. A diagnostic pneumothorax distinguishes these from intrapulmonary tumors.

When suspected, the radiologic appearance of hourglass tumors is characteristic. Shanks and Kerley[12] describe the neoplasm as averaging the size of a tangerine, sharply defined, projecting to one side of the spine where there is widening of the intercostal space corresponding to the tumor site and elevation of the rib immediately superior to it. Erosion of the

rib head, enlargement of the intervertebral foramen, and narrowing of the pedicles occur. Radiographically, anteroposterior, lateral, and oblique Bucky projections are essential for revealing the bone changes and tumor presence.

The treatment is surgical.

Ganglioneuromas are rare tumors. Caffey[18] states that usually they arise from sympathetic and spinal nerve ganglia. Destruction of the pedicles and bodies of vertebrae is not unusual. Radiographically they appear as large or small sharply circumscribed, homogenous, rounded shadows that project from the posterior mediastinum into a lung field.

Neurofibromatosis (von Recklinghausen's disease) is usually characterized by multiple tumors situated in the posterior mediastinum. Often it is associated with subcutaneous neurofibromatosis.

X-ray examination reveals nodular tumor masses of varied sizes anterior to and along side the vertebrae. Frequently erosions of rib heads, articular processes, and lateral aspects of vertebral bodies are present.

Intrathoracic meningocele may be associated with neurofibromatosis. The meningocele is cystic, with walls that are continuous with the meninges of the spinal cord. Its content is similar to spinal fluid. Bone erosions may be present.

Recognition of intrathoracic meningocele is often abetted by myelographic studies. Continuity of the tumor with the subarachnoid space as demonstrated by the opaque medium is corroborative. Failure to become evident by this method does not prove its absence.

Surgery is the accepted treatment.

INTRATHORACIC THYROID

Intrathoracic thyroid of the posterior mediastinum occurs infrequently when compared with that incident to the anterior and substernal regions. These tumors may arise from the lateral lobe of the thyroid gland, lateral or posterior aspect, often by a thin extension of a strip of thyroid tissue, and hence lie posterior to the inferior thyroid artery and the recurrent laryngeal nerve. Others are aberrant in origin, resulting from vestiges of thyroid anlage displaced in the embryonic thyroid invagination or a cellular anlage of thyroid tissue separated during development later to become a teratoma or possibly a benign metastasis in the mature individual.

Recognition of the intrathoracic thyroid in the posterior mediastinum is made upon evidence of obstruction of the superior mediastinum and roentgen examination. The rare aberrant type is radiographically similar to and usually confused with a dermoid. It is high in the thorax and may or may not descend upon deglutition. The radiographic density is considerable, with convex borders, sometimes pyramidal in shape with smooth, well-delineated margins. Because of slow development these tumors may become enormous in size before they are identified, often compressing the trachea, and even the aortic arch. Malignant degeneration of the thyroid adenoma may occur. It remains within its fibrous capsule.

Roentgen therapy is utilized if surgery is contraindicated. That this type of neoplasm is highly radioresistant is agreed by Kaplan,[7] Portmann,[9] and others.

TUMORS OF EMBRYONIC ORIGIN

Tumors of embryonic origin in the posterior mediastinum include bronchogenic, gastric, and enteric cysts. All are comparatively rare tumors. Robbins[19] reviewed 15 cases, 8 occurring in males, 7 in females, and at an average age of 38. They often appear in the newborn.

The most common of these neoplasms are the bronchogenic or duplication cysts. They are lined by ciliated columnar or cuboidal epithelial cells. The walls consist of various structures: smooth muscle, fibrous tissue, elastic fibers, cartilage, and nerves, and they have a vascular supply. The content is mucoid fluid, clear, and viscid. Normally they are noncommunicating with other structures, such as the trachea or bronchi. Exceptions are not unknown. Literature reports the diameter as 5 cm. or less.[5] All are congenital.

Robbins[19] states that these neoplasms may occur any place in the posterior mediastinum. They can simulate practically any mediastinal tumor.

The radiographic appearance is a round or oval density, with a smooth outline, which may resemble an aberrant thyroid, neurofibroma, dermoid cyst, malignant neoplasm, aneurysm, lymphoma, or even an encapsulated empyema. A mass that moves upon deglutition should be considered as a possible embryonic tumor. It may compress a bronchus or involve the extramucosal portions of the esophagus to a demonstrable degree.

Gastric cysts, as the name suggests, reproduce the gastric wall structurally. They may or may not function. In the latter, ulcers are not uncommon which may perforate the cyst wall into a lung with fatal hemorrhage resulting.

These neoplasms usually are seen in early life. They vary greatly in size and frequently result in respiratory complications with fatal terminations.

Radiographically, the tumors appear as rounded masses in the posterior mediastinum. Atelectasis or pleural fluid may mask their presence. An artificial pneumothorax may be revealing. The posterior location aids sharply in differentiating them from dermoid or other tumors of the anterior mediastinum.

Enteric cysts are extremely rare. They are differentiated from gastric cysts only by the lining, which is intestinal mucosa. The origin is probably similar to that of gastric cysts. Identifying characteristics are the same roentgenologically.

SUMMARY AND CONCLUSIONS

1. Various tumors of the principal structures of the posterior mediastinum have been discussed.

2. Differential identification is largely dependent upon roentgen studies.

3. Radiosensitivity is quite variable. A majority of the tumors are radioresistant.

212 Pythian Bldg.

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Radiation Therapy in Diseases of Childhood*

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It has been the writer's good fortune to have been associated with groups and hospital staffs wherein the pediatrician relied in many instances upon the services of the radiologist, both diagnostic and therapeutic. Only a comparative few of the childhood diseases are specifically amenable to radiation therapy—yet the excellent results by this modality bespeak for it a permanent place in the armamentarium of the pediatrician and the general practitioner. Much of the content of this paper has been taken from the writer's 30 years of experience with roentgen therapy. Neither periodicals nor radiologic texts give much specific information on this phase of roentgen therapy. Space does not permit full coverage of all the childhood diseases in which radiation therapy is a useful adjunctive therapy —therefore, this discourse will be confined to the more important diseases in which excellent results have been observed. Specific factors of technic will not be discussed as this phase of roentgen therapy should be left to the judgment of an experienced radiologist. Kaplan's excellent book, "Clinical Radiation Therapy,"[1] is recommended reading on this subject.

The skin of the child presents many problems, both acute and subacute, that will respond favorably to roentgen therapy. Allergic manifestations, so-called atopic dermatoses, are observed from the first year on. X-ray therapy is most useful in bringing the problem under control. Radiation therapy here is specific in its relief, but temporary, not curative; the true etiologic factor must be found and brought under control. It should be noted that the type of ray used must be strictly superficial, the dosage small, and treatments limited in number. Too heavy dosage at first causes the skin to develop a definite resistance and future treatments fail. The patient will probably need several courses of treatment to give relief from repeated attacks

The eczemas of the ear and auditory canal also fall under this category and are surprisingly responsive to specific localized roentgen treatments. Herpes simplex and "cold sores" respond often to one short specific localized exposure. Dermatophytosis or "athlete's foot" is prevalent among adolescents and is easily diagnosed. The vesicular stage is amenable to roentgen therapy but this treatment is usually not employed because patients try local remedies first and the condition has advanced to the scaly stage before the radiologist sees it. Superficial therapy may be given at weekly intervals for 4 or 5 treatments. All other local treatment should be continued as indicated.

Acne vulgaris is a disturbing condition found in adolescents of both sexes. Roentgen therapy is strictly adjunctive and other medical and hygienic forms of treatment must also be employed. Skin hygiene is of prime importance. Roentgen therapy is strictly superficial—150 roentgens a treatment at intervals of 4 or 5 days for five or six treatments. I strive to attain a "windblown" effect of the skin. Special caution should be exercised to protect the hairy areas and the mucosa of the lips. The patient and the parents should be warned that roentgen therapy will not relieve or eradicate the acne scars that are already present. The therapist should be familiar with the theoretical explanation of the biologic reaction of the skin to roentgen irradiation. Kelly[2] states that where an area of living tissue receives an adequate dose of roentgen therapy, nonspecific antibodies are liberated after some

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hours, depending on the time of irradiation, which will either prevent or cure certain infections having a short incubation period. Desjardins[3] and Hodges[4] state that destruction of lymphocytes within the pustules results in liberation of large quantities of labile, active endotoxins which are bactericidal.

Tinea capitis is a common childhood disorder. X-ray therapy becomes the treatment of choice only in cases which resist all other forms of therapy. Treatment calls for epilation therapy and, therefore, careful roentgen technic. I do not need to detail this technic for it has been described in all standard texts for years. Kienbock's technic as modified by Adamson is still standard. In tinea corporis, small patchy areas over the body respond quickly to a single x-ray treatment. The lesions are carefully circumscribed and treated with superficial technic; one exposure of 150 roentgens usually suffices.

Occasionally furuncles will develop within the nose and auditory canal of children. Superficial therapy delivered daily for 3 days has resulted in exceptionally quick cures and alleviation of all symptoms. Observation of two cases of giant cell epulis treated by surgical excision and which had recurred, showed roentgen therapy to be effective. This condition occurs in adolescents and is recognized by its extension from between the canines, bicuspids, or incisors as a solid tumor mass, arising from the periosteum of the alveolus. It is definitely radiosensitive. Irradiation therapy has also proved quite satisfactory in treatment of plantar warts or painful papilloma in children. Superficial therapy with 90-120 kv. with 0.5 mm. aluminum filter at 30 cm. distance is given. The lesion or lesions must be closely shielded with lead. A dose of 500 roentgens is administered and repeated at 3 to 5 day intervals according to the thickness of the wart. Painful papillomas are usually slightly embedded but with no heavy callus over the lesion. This type responds to only 1 or 2 treatments. Keloids in children quickly respond to weekly superficial irradiation with adequate shielding of the lesion.

Hemangiomas are noted immediately following birth. Patients are presented for treatment almost as soon as the mother is ambulant. There are roughly 3 classifications of lesions: (1) vascular and cavernous type hemangiomas; (2) port-wine stains and flat discolorations; and (3) small spiderlike lesions. All respond to radiation therapy, though the second named is more radioresistant than the others. The cavernous type is best treated with radium therapy while the second and third named may be treated with either radium or roentgen. Treatment and technic is also adequately described in standard texts. However, the treatment of any lesions over epiphyseal structures should be avoided.

A large majority of the infections of the upper respiratory passages arise in lymphoid tissue. Thus surgical removal of tonsils and adenoids results in quick and usually successful removal of the symptoms arising from those infections. However, lymphoid tissue is not limited to the tonsils, adenoids, and basal nasopharynx, but is also an integral part of the mucous membrane of the lateral and posterior walls of the pharynx and nasopharynx. In a fairly large percentage of operated cases it has been found that lymphoid tissue in children hypertrophies in these locations and gives rise to subacute symptoms. These are classified as upper respiratory infections or nasopharyngitis. Often the compensatory hyperplastic lymphoid nodules are so located as to definitely interfere with the function of the eustachian tubes. This in turn produces the beginning of adult loss of hearing. It is also the precursor of many cases of asthma or recurrent attacks of acute bronchitis in children. Further, it can be postulated that the actual pathology set up in these infected lymphoid nodules, and often repeated, leads to hyperemia, edema, and eventually to scar tissue in the mucous membrane of the middle ear. This impairs hearing and, in the presence of acute nasopharyngitis, it is the basic cause of recurrent attacks of suppurative otitis media. It should be emphasized that indiscriminate use of radiation therapy in any form is not advocated as a treatment for deafness. Radiation therapy may or may not improve the hearing, but it has been proved that this type of treatment has definite value in reestablishing the lumen and function of the eustachian tube which is partially occluded with hyperplastic lymphoid tissue.

Infected hyperplastic lymphoid tissue appears to cause the majority of the acute problems found in the upper respiratory tracts and structures of children. These infections spread or are carried to the bronchi, giving rise to the acute bronchial infections so common in children. Irradiation therapy is the ideal form of treatment for infected or hyperplastic lymphoid tissue in locations inaccessible to clean operative removal. Edema is constant following radiation therapy—thus the patient should not be given radiation therapy during the acute stage, but should have the advantage of local treatment until the acute stage has passed. The condition will recur; therefore, radiation therapy should be given during the quiescent stage when it can be given far more safely and efficiently. Polyps are extremely resistant and radiation therapy is not designed for their treatment. Radiation therapy is specific for the removal of hyperplastic lymphoid tissue alone.

Choice of the type of radiation source lies with the physician-radiologist handling the case. The monel metal applicator containing 50 mg. of radium sulfate in a tubular chamber with a 0.3 mm. platinum wall filter and also a later model in which the wall thickness is only 0.2 mm. platinum are in use today by both radiologists and otolaryngologists. Practically all the beta rays emitted from this type of applicator are absorbed within the tissues of the nasopharynx. Approximately 75 per cent of the beta rays are absorbed within the first 3 mm. of tissue—thus distant effects are negligible. The applicator specifically built for nasopharyngeal treatments is recommended. Applicators prepared in the physicians's own laboratory in which the wall thickness of the tubular chamber is added to the 0.5 mm. of the platinum needles produce a nonspecific and entirely different type of radiation, potentially capable of causing harmful local and distant reactions. The factors I recommend are: 140 kv., 5 ma., at 30 cm. distance; filtration 3 or 4 mm. of aluminum or ¼ mm. of copper plus 1 mm. of aluminum. The ports are small and the cones directed specifically to concentrate a crossfire effect upon the nasopharynx.

In summarizing the conditions of the upper respiratory structures responding to treatment by radiation, the following should be listed: (1) impairment of hearing based upon recurring eustachian tube obstruction; (2) recurrent otitis media or mastoiditis; (3) recurrent attacks of sinusitis, tonsillitis, or nasopharyngitis; (4) bronchitis secondary to upper respiratory infections; (5) selected cases of bronchial asthma,

postnasal discharges, and tinnitus; (6.) cervical adenitis associated with upper respiratory infections. Mention should be made of the infections of the bronchi and other chest structures which appear as extensions from the upper respiratory structures. Most common in my experience has been a tracheobronchial lymphadenitis which is recognized in the child as acute bronchitis. Since the infection attacks primarily the lymphatic structures, radiation therapy to the radiosensitive lymph glands results in immediate relief of acute symptoms. The results are striking in small children, even with what appear to be very small dosages.

Careful fluoroscopic screening and diagnostic films of the chest should be made preliminary to any roentgen therapy as an occasional unrecognized pneumonic process is discovered. X-ray therapy then becomes adjunctive to the other recognized methods of therapy, but the benefits to be derived from radiation therapy should not be neglected. Where the condition is obviously chronic and a well-established bronchial pathology is present, careful diagnosis must be made, utilizing all methods of examination. As a rule, acute pathologies can be helped with roentgen therapy—chronic pathologies are more resistant and require a longer series of treatments, utilizing heavier kv., more filtration, and longer treatments. The roentgen treatment of bronchiectasis in children is of doubtful value. Only those cases in which upper respiratory infections have been relieved first should be treated.

I have found that children with pertussis, who have not had immunizing treatment, respond quite well to direct x-ray therapy to the involved tracheobronchial lymphatic structures. The immediate effect of x-ray exposures in these cases is relief of the paroxysmal attacks of coughing, and shortening of the course of the disease by several weeks. That the results have been quite striking is attested by the number of cases referred by pediatricians and general practitioners.

Thymus gland pathology in the infant falls within the scope of roentgen therapy. The tremendously hypertrophied thymic structure that produces pressure upon the trachea and gives symptoms of dyspnea, hoarse crying, and cyanosis with occasional vomiting and convulsions calls for immediate roentgen treatments utilizing an anteroposterior port circumscribed to the specific area using high voltage therapy. Results should be apparent within 24 hours. A second and third treatment may be given at 2-day intervals with a total thymic tissue dose not exceeding 350 roentgens. Treatments may be repeated a month later if x-ray studies indicate their need. The dosage should not exceed the amount suggested or permanent damage may be incurred as evidenced by developmental failure. If the thymic structure fails to respond to roentgen therapy, one is justified in suspecting the presence of some other pathologic condition.

Simple colloid goiter often begins in girls at puberty. It represents a benign hyperplasia and may regress spontaneously. Surgery is sometimes employed but irradiation therapy is safer and is the method of choice. High tension factors are used, bilateral ports giving 100-150 roentgens twice weekly for 4 to 6 weeks. Excellent results are attained in this type only.

Mesenteric lymphadenitis in children is not uncommon as a primary entity or as postoperative sequelae to abdominal operations. Because the glands involved are lymphatic and radiosensitive, roentgen therapy is specific in its action and gives excellent results.

Bone pathologies often encountered in children are osteogenic sarcomas, Ewing's endothelial myeloma, benign solitary cysts of bone, osteitis fibrosa cystica, and the rare epiphyseal disturbances resulting in unequal leg lengths. All of these conditions are radiosensitive in varying degrees. In the osteogenic sarcomas early surgery offers the only hope for survival. Irradiation after surgery is probably the only treatment that can be offered for recurrences or metastases. Where surgery is contraindicated, refused, or plainly too late, irradiation may be used and the life of the patient prolonged.

Ewing's sarcoma (endothelial myeloma) is very radiosensitive. The primary tumor often will disappear under intense radiation but recurrences and metastases appear, thus making surgery the first choice of therapy. Preoperative irradiation followed by surgery and postoperative radiation therapy offers the greatest hope for survival or cure.

Osteitis fibrosa cystica may be found occasionally as a solitary lesion in children and should be treated both surgically and with irradiation. These cases have been treated successfully with irradiation alone. In those patients with generalized skeletal lesions, a parathyroid adenoma is usually present. Here irradiation is directed to the parathyroid structure using intermediate therapy to both sides of the neck, with treatments every 4 days until 1,500 roentgens are given to each area. Limb asymmetry, occasionally met with in my practice, has been treated by irradiation over the epiphyses of the long bone, which inhibits or slows the growth of that bone. High voltage therapy is given—150 roentgens daily to a total dose in air of 1,500 roentgens. These cases are usually found as sequelae to infantile paralysis.

Vertebral hemangioma—in my experience it has been found only in children and adolescents—is usually confined to one vertebral body showing a striated decalcifying process which if unrecognized or untreated results in extension into the pedicles and ultimate collapse of the body. The treatment is specific—support to the spine by cast or brace and roentgen therapy with high voltage irradiation. The first series should be given daily, delivering a total of 2,000 roentgens in daily doses of 200 roentgens. This series is repeated in 6 weeks or 2 months and a third series given if needed. The spine must be supported until complete regeneration of the body of the vertebra has been accomplished.

The xanthomatoses are a group of constitutional diseases variously classified and called Gaucher's, Neimann-Pick and Hand-Schüller-Christian diseases, and eosinophilic granuloma. The simple forms of these diseases show lytic lesions of the membranous skull, exopthalmos, and diabetes insipidus. Radiation therapy rapidly clears up the lytic lesions of the skull but these patients all eventually succumb to the original symptoms which recur or they die of intervening diseases.

Wilm's tumor or embryonal adenomyosarcoma of children is best treated by radical surgery. Wilm's tumor has shown a high degree of radiosensitivity, and preoperative irradiation will reduce the bulk of the tumor markedly and make surgery a much simpler and safer task. Where surgery is impossible, irradiation therapy can be the sole method of treatment, although surgery still remains the method of choice

with preoperative irradiation to reduce the size of the tumor mass.

SUMMARY

In this paper little mention has been made of specific technic as an understanding of the biological effects of the various forms of irradiation is presumed. The main purpose is to enumerate the many possibilities for successful application of irradiation therapy in the childhood diseases. Closer cooperation should exist between the pediatrician and radiologist in the handling of upper respiratory and chest problems of childhood. Proper application of roentgen and radium therapy to these infections will result in better health for the child as he approaches maturity. The public has long associated the radiologist and x-ray therapy chiefly with the treatment of cancer—it must now be educated to accept the proper application of radiation therapy to the diseases of childhood.

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Minimal Pulmonary Tuberculosis*

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Most observers agree that physical examinations are of little aid in the recognition of active tuberculous lesions of minimal extent. Roentgenologic signs, however, were invaluable aids to Reisner and Downes[1] in the evaluation of the clinical significance of lesions of minimal extent in ambulatory patients. The classification of pulmonary tuberculosis adopted by the National Tuberculosis Association in 1940, based upon extent of the disease—"minimal," "moderately advanced," and "far advanced"—is the most popular classification used today. Depending solely upon the roentgen film, it is the most exact classification.

Minimal lesions are defined as those without demonstrable excavation which are confined to a small part of one or both lungs. Furthermore, the total extent of the lesions, regardless of distribution, must not exceed the equivalent of the volume of lung tissue which lies above the second chondrosternal juncture and the spine of the fourth or body of the fifth thoracic vertebra on one side.

Considerable confusion exists in the differentiation of early or incipient tuberculosis and that classified as minimal. The terms "early" and "incipient" allude to time, while "minimal" refers to extent of involvement. "Incipient tuberculosis" is applicable to lesions that can be proved to be early; minimal lesions may be obsolescent. The duration of a lesion may be stated only if the exact time elapsing between a normal x-ray film and one indicating disease is known.[2]

Periodic x-ray examination of apparently healthy persons is the only means of studying the clinical and radiologic characteristics of truly early lesions. When a minimal lesion appears on the first film of an asymptomatic person, more often than not, roentgenologic appearance alone will not determine whether it is an early or an old focus. A record of previously normal lung tissue for comparison is the deciding factor as to whether a lesion is incipient. Rigler[3] maintains that x-ray symptoms of pulmonary tuberculosis should not be accepted as sole proof of whether the lesion is active or quiescent. Even in cases where activity appears evident in the x-ray, it should be confirmed in the light of the other clinical findings.

Generally speaking, if roentgen examinations are made at periods of 6 to 12 months routinely, the majority of cases are found in the minimal stage. In the group where the physician suspects pulmonary tuberculosis, and it is found upon examination, nearly all cases have progressed beyound the classification of minimal. The incidence of lesions of minimal extent in patients with symptoms of phthisis is well below 30 per cent. From 70 to 90 per cent of all minimal cases show no significant physical signs.[4] If a patient has the symptomatology characteristic of pulmonary tuberculosis and the x-ray findings are negative, x-ray examination in all cases is conclusive that the disease is absent. However, it must be remembered that some patients who show no symptoms pass through a latent period of approximately 10 weeks before pulmonary phthisis is apparent roentgenographically. This point should be kept in mind continually, especially in relation to those patients who are known to have been recently exposed.

Absence of roentgen signs does not exclude the residua of previous pulmonary tuberculosis. These former lesions may have resolved beyond the point of recognition radiographically or they may be hidden from view. From 1.3 to 4.9 per cent of all chest films disclose evidence of reinfection tuberculosis.[5]

When the usual lesions classified as minimal are found, the whole problem of diagnosis and treatment becomes complicated. Since the classification of minimal has no time or activity value, the duration of such a focus is unknown and the state of activity must be determined. The quality of the lesion can be evaluated only after serial films taken over an adequate period have been studied. Regressive or progressive changes in size, shape, and density must be accepted as evidence of activity.

The three main diagnostic criteria for an active lesion are: (1) Roentgenologic changes in the lesion; (2) symptoms attributable to tuberculosis; (3) tubercle bacilli in the sputum and gastric contents. All three are usually present in active minimal lesions and are

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more reliable than blood counts and sedimentation rates.[2]

Direct contact is the means of infection with the tubercle bacillus. However, contrary to developments with other micro-organisms, disease rarely follows infection at once, if at all. The initial infection is not usually the chief cause of clinical tuberculosis, especially in the adult. Most cases are the result of superinfection, or reinvasion, after the original infection. Thus, although most adults have been infected at some time, comparatively few become ill. Recently an increase in adult primary infection has been noted. This trend has probably been emphasized by improved early diagnostic methods. Two factors determine the development of tuberculosis in the individual: (1) the intensity of the infection, and (2) the receptivity of the host.[6] At present 50 per cent of the population of the United States has been infected with tubercle bacilli. In thickly populated areas, the incidence is probably as high as 80 per cent.

The physician is wont to be unduly influenced by the results of the tuberculin patch test when interpreting lung markings. A positive tuberculin test if often considered proof of the character of dense areas and vice versa. However, if he does not know the previous lung history and possible related body pathologies, the physician can hardly depend on the film alone to distinguish primary infections from reinvasions, particularly in the adult. In a group of student nurses who developed primary infections, as evidenced by a change in tuberculin sensitivity from negative to positive, Malmros and Hedvall[7] noted no roentgenologic changes in the majority. While generally a shadow on a film may be identified as a tuberculous lesion from its situation, shape, outline, and density, it cannot be proved active from the film alone.[8]

Early lesions of pulmonary tuberculosis are microscopic and may exist for some time before they become evident radiographically. When the lesions attain a size of 2 to 4 cm. they appear as phthisis of minimal extent. Most lesions of minimal extent occur 4 to 8 cm. below the extreme apex of the lung, when viewed with standard technic, and appear infraclavicular. A few occur at the extreme apex. There is disagreement among authorities as to which area is the first site of reinfection. The subapical lesion is more common. Small foci may be single or multiple. These fibroid or calcified nodules are frequently present in both upper lobes and may be surrounded by emphysematous lung or small areas of rarefaction. It is assumed that the rosette-like obstructive emphysema develops as a check-valve obstruction to a small group of bronchioles, as in other diseases. They may be caused by peribronchiolar fibrosis or actual intraluminal disease.[8]

It should be remembered that not all apical lesions are tuberculous. Strictly apical shadows may be caused by pleural thickening and form the classical pleural cap. These shadows often hide very small discrete nodular lesions, considered latent but potential sources of spread of the disease to other parts of the lung, including the area below the clavicle, especially if fluffiness around them is suggestive of recent exacerbation.[9] Small shadows meeting in the apical region caused by soft tissues of the neck, calcified glands, ribs, calcified cartilage, and those of vascular origin must be differentiated from tuberculous foci.

In the subclavicular region, lesions are frequent on the right and may be seen as small, very dense, irregular, rounded shadows or they may be large and triangular. They also appear as a circumscribed tuberculous bronchopneumonia. Lesions of recent origin sometimes reveal enlargement or calcification of the associated hilar nodes.

Lower lobe lesions without lesions elsewhere in the lungs occur somewhat uncommonly, but are not as rare as has been estimated. Basal tuberculosis should not be grouped with lesions involving the superior part of the lower lobe. Early basal lesions are seldom found, but the upper part of the lobe often is the site of initial manifestations and of metastasis in adult phthisis. Tuberculosis of the lower lobe is common in women, but rare in men.[9] Homogeneous "cottonwool" type lesions are more frequent in this region than the nodular or linear fibrosis seen in other areas. Goldberg[10] states that these lesions are usually located high in the lung but at the periphery toward the mediastinum and are therefore easily overlooked. As a rule, the posterior areas of the lung are affected rather than the anterior.

Shadows in the peripheral parts of the lung usually indicate pleural involvement. Thickened pleura may dip into the interlobular septa or may appear as a dense peripheral band. Rounded semicircular shadows, base to the chest wall, can be caused by a simple localized pleural effusion, or to extrapleural collections of pus from tuberculosis of bone or periosteum.[9]

Roentgenograms cannot always be classified according to their pathologic appearance. Personal variations may exist in the physicians' interpretation of the character of the lesion, and often, the lesion cannot be placed in any one category; several types of infiltration may be present.[11] Medlar and his associates[12] in a comparative study found that dense, noncaseous, caseous, caseofibrotic, and fibrotic areas could not be differentiated in roentgenograms of inflated excised lungs. They comment: "It is a very common practice for interpreters of roentgenograms of the chest to use such pathological terms as fibrotic, fibro-caseous, calcified, productive, exudative, et cetera. From our experimental study it seems doubtful, except in instances where considerable calcified deposits are present, that such pathological interpretations are correct when shadows seen in single roentgenograms of a chest are interpreted. . . . We suggest it would be a better practice if interpretation of intrathoracic shadows observed in roentgenograms of the chest are limited to descriptions of the location, extent of distribution and density of shadows, and to forego any pathological interpretation until a satisfactory classification has been evolved which will clearly differentiate the processes mentioned above."

However, Burke and Parnell[3] in a review of 329 patients to assess the status of asymptomatic minimal pulmonary tuberculosis emphasize the value of serial roentgenograms in observing lesion characteristics and changes.

The study lends weight to the now widely held view that physical examinations, including special efforts to detect latent râles, are of little or no value in the assessment of the status of minimal pulmonary tuberculosis in seemingly well persons.

The observations recorded herein demonstrate that serial x-ray pictures are of inestimable value in the assessment of the status of asymptomatic minimal pulmonary tuberculosis. The criteria employed in the interpretation of the serial x-ray pictures of the patients included in this study differed from those used by Reisner and Downes and by Kruger, Potter, and Jaffin. The criteria employed herein had, for the most part, to do with lack of change, or changes in the size of the

abnormal shadows rather than with the character of the abnormal shadows at the time the disease was discovered, or at some subsequent date. The fact that only 16 of the 329 patients, whose serial x-ray pictures showed no significant change in the size of the abnormal shadows during their periods of supervision and treatment, were classified as having active or quiescent disease . . . seems to indicate that stationary abnormal shadows constitute a reasonably accurate guide to the status of tuberculous lesions of minimal extent discovered on routine x-ray examination of seemingly well persons. . . . One other observation with respect to the serial x-ray pictures of the patients included in this study seems to deserve special comment. The findings recorded herein suggest that patients in whose serial x-ray pictures the abnormal shadows show a tendency to decrease in size are almost as certain to have active lesions as the patients in whose x-ray pictures the shadows show a tendency to increase in size. Comparison of the status . . . of patients in whose serial films the abnormal shadows tended to decrease, and of those in whose films the shadows tended to increase, seems clearly to indicate that the former group of patients is likely to do better than the latter group in so far as arrest of their disease is concerned.

While an extensive variety of lesions must be differentiated from tuberculosis, space permits the discussion of only the more common x-ray shadows that might confuse diagnosis. According to Zacks,[14] "shadows simulating pulmonary tuberculosis are frequently due to early pulmonary abscess, neoplasm, coccidioidomycosis, or primary atypical pneumonia."

Early nontuberculous pulmonary abscesses and x-ray residuals of healed abscesses sometimes create pulmonary shadows resembling tuberculous foci. Investigation of the clinical history will reveal the correct diagnosis. X-rays of apparently healthy lungs may also show large or small rounded shadows, or multiple irregular densities characteristic of pulmonary neoplastic metastasis. These lesions may be identified through a history of breast, prostate, or other operation. Primary alveolar pulmonary cancer is not common. Other primary neoplasms are always bronchogenic in origin and are identified by x-ray signs of bronchostenosis such as localized emphysema and segmental or lobar collapse.[14]

Another disease presenting x-ray shadows resembling pulmonary tuberculosis is coccidioidomycosis. However, in this disease the lymph nodes and ribs are usually affected. Coccidioidomycosis cavities are easily identified, once seen. Previous to World War II, this disease was most prevalent in California and Texas. It is now a chest disease of veterans throughout the country.[14]

Primary atypical pneumonia shadows are usually found in the lower or medial portions of the affected lung and extend in a wedge shape toward the hilum. However, mottled irregular shadows sometimes seen in the upper portion of the lung have been mistaken for tuberculous lesions. During the fall and winter, this condition appears in persons who have or have had a cold. Shadows due to colds will disappear in 4 to 6 weeks whereas tuberculosis shadows remain.[14]

As previously mentioned, tuberculosis lesions classified as minimal refer to extent of involvement and preclude no time or activity value. Nevertheless, serial x-rays of minimal tuberculosis when studied in sequence over a period of years do serve as a gauge of activity. Probably the most logical single criterion of activity is change in size rather than change in characteristic appearance of the lesion as this is an exact change which can be measured directly on the roentgenogram. In asymptomatic tuberculosis of minimal extent, measured change in surface area of the lesion, whether progressive or regressive, is the only positive roentgen evidence of activity. In more than one third of the patients with minimal lesions at Henry Phipps Institute, progression of the lesion was noted, adequate proof of the seriousness of minimal tuberculosis.[15]

No doubt the future will show a great increase in the early diagnosis of tuberculosis. Bobrowitz[16] states that

> . . . it is almost safe to predict that in time our enlarged and more effective public health programs will eventually realize a reversal of the present ratio of 85 to 90 per cent admissions to tuberculosis hospitals of moderately and far advanced cases, to a proportion of 85 per cent or more, in the minimal stage. Predictions have been made concerning the eradication of tuberculosis by 1960, but before that occurs the disease must be found and treated early.

A better understanding of this subject on the part of the roentgenologist will materially assist the fulfillment of this prediction.

Once minimal pulmonary tuberculosis has been discovered, the case should be observed by the physician for a period of 10 years, if the lesions retrogress and stablize under x-ray observation. X-ray evidence of fibrocalcific apical foci in the lungs of healthy adults does not necessarily indicate active lesions unless the patient has a history of tuberculosis within 10 years. These lesions almost always remain quiescent and the disease seldom recurs. Well persons with such lesions may be dismissed but advised to have periodic chest x-rays in the future. In patients under 35, inactive lesions should be constantly observed as this age group is most susceptible to reinfection.[14] Adolescents especially present a poor prognosis.

Patients with minimal pulmonary tuberculosis should be hospitalized until their x-ray lesions remain stable for at least 6 months. This measure can reduce the number of cases that progress after discharge or require collapse therapy. The National Tuberculosis Association requires that the x-ray findings for 6 months be compatible with a stationary or retrogressive lesion for a case to be classified as arrested. If resolutions or retrogression indicate that the lesion is unstable, treatment should be continued until x-rays show definite stability over a period of 6 months.[14]

SUMMARY

1. Most observers agree that x-ray examination is the most valuable single procedure for the early discovery and diagnosis of minimal pulmonary tuberculosis.

2. The classification of tuberculosis by the National Tuberculosis Association in 1940 as "minimal," "moderately advanced," and "far advanced" is based on extent of involvement and does not refer to time or activity value of the lesion.

3. Activity value of a lesion can only be assessed after viewing successive serial studies.

4. The incidence of symptomatic and asymptomatic lesions has been discussed.

5. Absence of roentgen signs does not necessarily exclude the presence of active minimal pulmonary tuberculosis.

6. Recent epidemiologic trends show an increased incidence of primary tuberculous infection in adults.

7. The location of typical minimal tuberculous lesions in the pulmonary areas has been discussed as well as a consideration of pathologic terminology in relation to roentgen interpretation.

8. In considering tuberculous lesions of minimal extent, further breakdown of this classification on a

pathologic basis from the roentgen standpoint is unsatisfactory.

9. It has been suggested that better criteria for assessing the activity of tuberculous lesions of minimal extent on serial studies could be set up. They should be concerned primarily with change in the size of a given lesion or absence of change rather than with the character of the abnormal shadows at the time of discovery or at some subsequent period.

10. Certain lesions which must be differentiated from pulmonary tuberculosis of minimal extent have been discussed.

11. In asymptomatic tuberculosis of minimal extent measured change in surface area of the lesion, whether progressive or regressive, can be calculated closely from serial x-ray studies and positive roentgen evidence of activity can be assessed.

12. The consideration of prognosis and follow-up examinations from the roentgen point of view has been discussed. The fallacy of considering a retrogressive and stationary lesion in more or less the same category has been pointed out.

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The Chest in Geriatrics*

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The roentgen study of the chest in geriatrics should be of interest in view of the increasing proportion of our population in the older age brackets. Literature on this subject is somewhat limited; thus it was felt that a correlation of some of the findings might be of value to the roentgenologist.

Inevitable changes take place in the chest, as well as in other parts of the body, with increasing age. The rate and degree of these changes are quite variable and seem to depend on many factors which are as yet not fully understood and which will not be discussed in this paper.

Chest x-rays of elderly persons should be taken with great exactness as over-penetration which hides significant changes is a common error. Careful instruction to the patient in regard to position and breathing are imperative as well as selection of the proper technical factors.

The thoracic cage exhibits some typical changes in both structure and function. Kyphosis and senile osteoarthritis of the dorsal spine, with alteration of the angle of the ribs, cause an increase in the depth of the chest, particularly the base. Anatomic changes in the position of the thoracic viscera are influenced by alterations of the cage. The trachea often deviates toward the right in older people as it passes the less yielding and hardened arch of the aorta. This should not be confused with tracheal displacement caused by alteration of intrathoracic dynamics, associated with atelectasis or other clinical entities.

With atrophy of the spine and anterior wedging of the vertebral bodies, kyphosis is inevitable and an associated change in the cardiac x-ray silhouette appears. The cardiac shadow plunges into the abdominal shadow, making it appear small and globular in the posteroanterior projection. The vascular shadow is diminished in height and the right contour becomes straight, unless marked aortic dilatation occurs. The heart comes to rest on the diaphragm which ascends posteriorly with the deepening of the chest. This results in lowering the base of the heart and underestimation of its size when examination is limited to the posteroanterior view.[1] Change in the heart may also result from scoliosis.

Changes also appear in the hilar shadows. However, the significance of these changes must be weighed thoroughly before attaching clinical significance to the findings.

In the senile lung there is a grave tendency for the alveolar septa to break down from innate weakness caused by atrophy. The alveoli form larger air spaces, and the lung presents an over-aerated appearance.[2] The vascular arborizations are uneven with atherosclerosis of the vessels and interstitial fibrosis of the lung.

Regarding the function of the thoracic cage, Thewlis[3] states, "Degenerative changes of the thorax and spine cause diminution in respiratory capacity." The excursion of the ribs is reduced so that most respiratory movement is performed by the diaphragm. Important sequelae are decreased venous return to the heart and increased load on the right heart, probably from shrinkage in the pulmonary vascular bed and pulmonary hypostasis.

When considering the pathologic entities of the chest in geriatrics, unusual signs or distinguishing fea-

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tures are not always found to aid in the diagnosis. Minor difficulties caused by the alteration of structures with increasing age may be encountered. Some of these factors are noted often enough to be considered relatively normal while others are of pathologic significance.

Senile or atrophic emphysema might well be considered in this category. Thewlis[3] calls this an anatomic condition, resulting from senile degeneration, atrophy, and perforation of the alveoli. The contributory factors are alterations of the thoracic cage, with rigidity of the chest wall and inadequate nutrition to the lobules caused by arteriosclerosis of the pulmonary vessels. Emphysema of this type is neither compensatory nor obstructive, as the lung is not unduly inflated but appears over-aerated by the larger air spaces resulting from alveolar coalescence. Senile or atrophic emphysema is to be differentiated from hypertrophic emphysema, which is a misnomer, as the underlying changes are fibrosis and atrophy of the lung, rather than hypertrophy. The causes of this clinical condition are usually chronic asthma or chronic bronchitis. It has been pointed out by Snow[4] that in older people repeated attacks of left heart failure bring about bronchial spasm, which eventually produces obstructive emphysema of the lung, indistinguishable from that caused by asthma. Functionally, the patient suffers from a decreased vital capacity of the lungs and its physiologic counterparts.

Cardiac enlargement without evidence of decompensation is a frequent finding in the aged. However, the incidence of cardiac failure, with its pulmonary manifestations, also is high with increasing age. This is to be expected in view of the alterations of vascular structures throughout the body. Another important contributory factor is pulmonary hypostasis, evolving from weakness of the respiratory movements. With cardiac insufficiency, associated areas of atelectasis, edema, and bronchopneumonia may occur. The aorta also frequently displays changes in size and contour and associated signs of atherosclerosis are common.

Of the pathologic entities of the lungs, acute bronchitis can cause death in senile persons. Most cases are due to acute exacerbation of chronic bronchitis. The clinical course of the disease is often rapidly terminal, probably developing into bronchopneumonia because of poor bodily defenses and extension to the alveolar sacs. Pneumonia in all of its forms is still common in the aged.

The incidence of pulmonary tuberculosis is increased in the aged. This increase is closely related to the social and economic status of the patient; substandard diet and unhygienic living conditions predispose the patient. The great majority of deaths from pulmonary tuberculosis in Summit County of Ohio in 1950 were those of people in the older age group. In considering pulmonary tuberculosis, Snow[4] has pointed out that the commonest cause of hilar node enlargement is tuberculosis, particularly at the left main bronchus in the region of the pulmonary artery. This may cause distortion of the bronchus and pressure on the vessels, with a distal increase in vascular arborization. The condition should not be mistaken for fibrotic tuberculosis of the parenchyma.

Of the lung pathologies, bronchogenic carcinoma is probably showing the greatest increase of incidence. In the quarter century just past, the annual number of deaths from bronchogenic carcinoma in England and Wales increased fifteenfold.[5] An increase also is reported in Canada, Australia, Switzerland, Denmark, and the United States. Early diagnosis and treatment are essential. The difficulty of definite diagnosis by routine chest film alone is obvious. Lateral film studies for detection of strip atelectasis, often the first evidence of cancer, are imperative. Robbins and Hale[6] state: "Although the commonly accepted signs of collapse are of definite value, the appearance and position of the septa and hila are of more importance and may be the first signs suggesting the diagnosis." The interlobar fissure presents a concavity toward the lobe involved; however, instead of atelectasis, a nodular mass of infiltration may appear near the hilum. Obstructive emphysema may follow and later, atelectasis. Swenson and Leaming[7] have expressed an idea which might well be labeled a cardinal rule: "Once the question of a neoplasm has been raised, one must never temporize."

The appearance of suppurative pneumonia or abscess with bronchogenic tumor is not rare. Swenson and Leaming[7] are of the opinion that every cavity in the lung, with or without a fluid level, must be considered as possibly associated with tumor until proved otherwise. If the patient is over 40 and the clinical course has been in any way atypical,[3] cancer is especially to be suspected. Likewise, shadows suggesting suppuration in the pleural space with or without involvement of the adjacent lung parenchyma must always be considered as possible neoplasm. All so-called "solid" shadows should be viewed in this light.

Of the theories concerning malignancy, one remains definite: incidence of malignancy increases with age and for that reason it should be given serious consideration when studying the chest of the older patient. The metastatic neoplasms of the lung may present considerable diagnostic difficulties, particularly in patients with lymphatic infiltration. This type of spread is most common from carcinoma of the stomach, breast, and pancreas, but may arise from neoplasms of other organs. The early appearance of metastasis may manifest itself as a simple accentuation of the linear markings of the lung, with streaking and mottling converging at the hilum, followed by bronchial and mediastinal node enlargement. Occasionally metastatic neoplasm appears as localized bronchopneumonia, but clinical history and serial roentgen study will aid in the differentiation.

In conclusion it must be stated that careful correlation of all the findings, including the history and other clinical data, must be evaluated in the final analysis. This is well exemplified in roentgen study of the chest in geriatrics.

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Renal Tumors with Special Reference to Differential Diagnosis*

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The diagnosis of renal tumors depends largely upon the cooperation of the roentgenologist and the urologist; the final diagnosis as to whether a lesion is malignant or benign remains with the pathologist. Therefore the roentgenologist must regard all renal neoplasms as malignant until proved otherwise. The shortcomings of present diagnostic methods are numerous and renal tumors are rarely diagnosed in the absence of symptoms. Therefore, the roentgenologist must be always on the alert for the most minute signs of kidney tumors. Unfortunately many renal tumors are not diagnosed until surgical removal is out of the question or distant metastasis has taken place.

The classical symptoms of renal tumors are hematuria, pain, and a palpable mass. The most important of these is hematuria which should immediately direct suspicion to the kidney. Tumorous growths elsewhere in the body, particularly in the lungs or peripheral lymph glands, which may be metastatic lesions from renal tumors tend to implicate the kidney as the seat of trouble.

In evaluating diagnostic methods for kidney tumors it is generally conceded that retrograde pyelography which produces sharp, clear, calyceal and pelvic delineation is preferable to the intravenous method. Intravenous urography has a definite place in renal diagnosis but in cases of suspected renal neoplasm the retrograde method is superior. However, in cases of gross hematuria where the retrograde method may be somewhat hazardous, intravenous pyelography may be the method of choice.

The scout film survey is of inestimable value as a preliminary to the more detailed diagnostic methods employing contrast media. Roentgenograms taken with the gastrointestinal tract cleared as much as possible of gas and fecal material, and supplemented by oblique and lateral views, aid materially in locating intra-abdominal or retroperitoneal masses and opacities of renal or extrarenal origin. The barium clysma may also be invaluable in differentiating renal from extrarenal pathologies because it reveals the directional displacement the mass may produce on the colonic tract. I do not favor pneumopyelography or perirenal insufflation because their advantages do not compensate for the danger of air embolism inherent in both procedures.

A diagnostic procedure which appears to have some merit is the cytologic method of Papanicolaou in which malignant cells are demonstrated in the urinary sediment.

When tumor of the kidney is suspected, chest films should also be taken. If pulmonary metastasis is present, nephrectomy is unwarranted.

Satisfactory ureterograms are essential because of the possibility of tumorous extension into the ureter or even a primary papillomatous tumor in the ureter and none in the kidney. In the event of papillary tumor of the renal pelvis with ureteral implant, nephrectomy may be a fatal error.

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The comprehensive classification of renal tumors such as is used by the pathologist should not necessarily be used by the radiologist from a diagnostic point of view. There are two main groups of tumors: (1) those arising from the kidney pelvis which may be either sessile or papillary, the benign ones being simple papillomata while the malignant ones are usually of the squamous cell variety; and (2) those arising from within the kidney substance, either benign adenoma or the so-called hypernephroma (adenocarcinoma).

It is often impossible to differentiate benign from malignant tumors radiographically; thus the importance of other symptoms is emphasized.

TUMORS OF PARENCHYMATOUS ORIGIN

Hypernephroma. Grawitz[1] in 1883 identified the structure of hypernephroma with that of cortical hyperplasia of the suprarenal gland and attributed the tumors to misplaced adrenal rests deposited in the capsule and cortex of the kidney during fetal life. This view was held for a considerable time but it is now known that the tumors are renal carcinoma (adenocarcinoma). These form by far the largest group of malignant renal neoplasms and occur almost entirely after the age of 40, most often in males.

The symptomatology varies considerably; common symptoms are hematuria, pain, abdominal mass, weight loss, and weakness. Hematuria may be either an early or a late symptom and occurs when there has been invasion of the calyces or pelvis and when there is venous stasis of the mucosa of the renal pelvis. Pain, when present, occurs in the flank area and may be attributed to stretching of the kidney capsule or to the sheer weight of the tumor mass.

The mass may be either a clinical palpatory finding or discovered radiographically. The scout film may show important positive diagnostic signs such as increase in size or density of the kidney, irregularity of outline, or the presence of calcium deposits. Size of the tumor mass in hypernephroma may vary greatly, ranging from an indiscernible nodule which will escape detection radiographically to a huge mass filling a large part of the abdomen.

Pelvic and calyceal distortions are common findings in hypernephroma with elongation of the calyces and pelvic displacement. Calyceal invasion by the parenchymal tumor is not an uncommon finding. When this occurs the radiologist may have difficulty in differentiating a parenchymal from a pelvic tumor. These pelvic and calyceal changes are confined to malignant tumors but it must be remembered that a solitary cyst of sufficient size may closely simulate the changes already mentioned except that cysts do not invade the pelvic or calyceal structure. Often, however, it may be impossible to differentiate one from the other by the mere fact of noninvasion of the pelvis or calyx.

Polycystic disease of the kidney may be differentiated from malignancy by the fact that polycystic disease is nearly always bilateral and the condition is congenital.

Nonmalignant opaque calcifications of the renal parenchyma are usually multiple well-circumscribed areas such as those found in tuberculosis, pyonephrosis, and parathyroid disease. In contrast, calcified hypernephroma produced subsequent to hemorrhage in malignant tumors tends to be rather diffuse and granular in appearance.

Carbuncle of the renal cortex also must be differentiated from parenchymal tumors. The clinical picture should be of great value since the symptoms are those of an acute infection such as pyrexia or leukocytosis. Radiographically, the carbuncle produces a tumorous mass of variable size. The suppurative process casts a hazy shadow which in the presence of radiopaque dye in the pelvis and calyces may displace and distort them and also partially obliterates them. In the upright position a fluid level may be demonstrable. Associated perinephritic abscess characterized by obliteration of the psoas shadow on the side of involvement, immobility of the involved kidney, and often a convex curve of the lumbar spine away from the affected side may be seen.

Splenic enlargement, pancreatic cysts or tumors and echinococcic cysts comprise the list of important extrarenal masses which must be ruled out in diagnosis.

MALIGNANT TUMORS OF THE KIDNEY PELVIS

Hedenius and Waldenstroem[2] in 1878 first reported a case of carcinoma of the renal pelvis in a 79 year-old man. Hematuria may be the first symptom of kidney tumors in this location, occurring more often than in parenchymal tumors because parenchymal tumors do not always invade the calyceal or pelvic structures. These tumors range in size from minute papillary nodules to those large enough to fill completely the kidney pelvis. Whether these tumors are benign or malignant cannot be determined from the roentgenogram.

Large pelvic tumors distort the pelvis and may obstruct some of the calyces and result in localized hydronephrosis. Small tumors around the pelvic ureteral juncture may obstruct the ureter to such an extent that a generalized hydronephrosis results. Tumors of the renal pelvis also may invade the kidney parenchyma just as parenchymal tumors may invade the pelvis, to the extent that the kidney outline is distorted with a palpable mass. When this occurs, it is almost impossible to differentiate between a primary pelvic or a parenchymal tumor.

Radiographically, a solitary papillary tumor may appear as a small, well-circumscribed area of radiolucency located in either the pelvis or in a calyx sometimes not even large enough to produce any obstructive changes. Another located in a calyx may be large enough to produce a localized hydronephrosis of that calyx. Still another may be large enough to occupy the entire renal pelvis, appearing as a mass of lessened density and in the extreme will erode the confines of the pelvic-calyceal structures to invade the kidney parenchyma.

A blood clot located in either the kidney pelvis or calyceal structures may closely simulate a papillary tumor. Upon a single examination it may resemble a tumor but repeated irrigations of the pelvis will usually disintegrate the clot and move it or completely wash it away.

Air bubbles introduced through the ureteral catheter may be misinterpreted by the radiologist. They may be solitary or multiple and closely simulate papillary tumors. A change in position of the patient or irrigation will shift location of the bubbles or obliterate them altogether.

Tuberculosis of the kidney in an early stage may so closely resemble a pelvic neoplasm that radiographically the two are indistinguishable. For example, a filling defect in a minor calyx with fraying and distortion at its terminal portion may present the same appearance in both neoplasm and tuberculosis. In the more advanced cases, calyceal stricture is diagnostic of tuberculosis. Nephrolithiasis in renal tuberculosis is characterized by clumping in the parenchyma, some of which may break away and lodge in the pelvis or ureter. Calcification of a tumor is usually less dense and granular in appearance.

Tuberculosis tends to occur in a younger age group and may be bilateral. The urine contains pus, albumin, and tubercle bacilli although these findings are not always present. Pulmonary studies are important, for finding a primary tuberculous process increases the likelihood of a similar kidney condition.

Late and well-advanced renal conditions are usually simple to diagnose radiographically, but early and obscure pathologies may test the diagnostic ability of the radiologist to the limit.

RENAL TUMORS IN CHILDREN

Renal tumors in children are chiefly the mixed tumor of Wilms, embryonal adenomyocarcinoma, and embryoma. Any tumorous mass of renal origin in the child, either palpable or discovered radiographically, is most likely to be embryoma. Sarcoma of the kidney must also be considered, although it is extremely rare.

Here again retrograde pyelography is favored over the intravenous method because of its greater reliability. Preparation of the child for examination is, in the main, unsatisfactory because children physiologically seem to retain more gas in the gastrointestinal tract than do adults. As stated by Campbell[3] the child brought from the street without preparation is in better condition for examination than one after great pains have been taken to cleanse the gastrointestinal tract.

I have used Neoskiodan in the same concentration for children as for adults. The pressure injection method is used under fluoroscopic control. The intramuscular method also has been used in the small child where veins are not accessible. Ten to 20 cc. of Diodrast (35 per cent solution) is injected intramuscularly; one half the amount decided upon is injected into each gluteal area. Time for obtaining the best film varies, but usually maximum excretion occurs 30 to 45 minutes after injection.

In diagnosis of tumors, pelvic-calyceal distortions from tumor compression should be noted as well as kidney displacements. The diagnostic features closely resemble those seen in cortical tumors in the adult. Conditions which must be differentiated from renal tumors are (1) renal cysts which may be regular in outline, although this is not a reliable sign; (2) hydronephrosis which in conjunction with tumor presents a renal mass far larger than the pelvic hydronephrosis would suggest; and (3) polycystic disease, usually bilateral and presenting compressed spider-leg deformity of the calyces. Pelvic tumors in the child are practically unknown.

Skeletal metastases from carcinoma of the kidney are always destructive and rarely produce new bone.

Earliest signs are detected in the cortical area. Metastasis has a predilection for the upper ends of the long bones.

Small silent hypernephromas give rise to more extensive bone involvements than the larger kidney lesions, perhaps because the small growths are not as fulminating as the larger ones and have a greater survival period.

Pulmonary metastasis from parenchymal lesions occurs most frequently. They take the form of fairly large well-circumscribed nodules commonly termed cannon-ball metastasis. Occasionally enlarged mediastinal and hilar nodes are found. Pleural involvement per se is rarely seen, but when it does occur it is accompanied by effusion.

SUMMARY

1. The combined skills of the radiologist, urologist, and pathologist are essential in the diagnosis of renal tumors.

2. The classical symptoms of these tumors are hematuria, pain, and a palpable mass.

3. In the radiographic diagnosis of kidney tumors retrograde pyelography is the most conclusive method although there are instances where the intravenous and intramuscular methods are preferred.

4. When neoplasm of the kidney is suspected, films of the chest and skeletal studies should be made.

5. The radiologic classification of renal tumors falls into two main groups:

a. Tumors arising from the kidney pelvis

b. Tumors arising from the kidney substance.

6. Often it is impossible to differentiate benign from malignant tumors of the kidney radiographically.

7. Renal tumors in children are chiefly the mixed tumor of Wilms.

8. Metastasis from malignant renal tumors is always destructive in the skeletal structures while in the lungs the lesions are of the cannon-ball type.

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Book Notices

ROENTGENOLOGY IN OBSTETRICS AND GYNECOLOGY. By William Snow, M.D., Chief Radiologist, Veterans Hospital; Consulting Radiologist, Willis-Kinghton Memorial Hospital and Clinic, Shreveport, Louisiana; Formerly Director of Roentgenology, The Harlem Hospital, The Bronx Hospital, New York, New York. Cloth. Pp. 363, with illustrations. Price $10.50. Charles C Thomas, Publisher, 301 E. Lawrence Ave., Springfield, Ill., 1952.

Although this monograph is presented as a second edition of the author's earlier text (Clinical Roentgenology of Pregnancy) it is essentially a new book. A total of 173 pages and 177 illustrations have been added with adequate treatment of the role of radiology in gynecologic diagnosis.

The Snow method of pelvimetry and cephalometry, since its presentation in 1934, has become one of the widely accepted methods of roentgen study of pregnancy. This reviewer has had the opportunity of doing approximately 700 studies by this method on primiparous women. Follow-up obstetric histories have demonstrated the accuracy of the predictions based on this technic.

Roentgen study of pregnancy has its most practical and useful value to those that handle obstetric cases in that they may recognize difficult ones and plan for their proper care before labor takes place. This is especially true of the physician who does not do a wide obstetric practice, and consequently has a limited experience. If such a doctor is forewarned, he is able to provide a more experienced obstetrician for his patient and not be forced to do so after a prolonged labor has done irreparable damage. This latter situation occurs too often in America, and it is by no means limited to one school of practice.

In the preface the author calls attention to obstetric roentgenology as now ranking as a special field of study but one in which there is room for further research. For example, all roentgenologists know that films obtained with soft tissues of pregnancy and fetal parts will be poor in contrast and that the illumination employed for reviewing must be especially adapted to low intensity in some cases and brilliant intensity in others. Furthermore such films require a considerable degree of skill in identification of the shadows. This skill is only acquired by broad experience. It has been necessary in this text, therefore, to employ tracings to supplement certain of the illustrations in order that they may be more helpful to the reader. The retouching has been limited to the degree necessary to make the films adequate for study as reproductions. With that explanation the illustrations can be said to be of excellent quality.

Chapter I constitutes a general discussion of the subject and will be helpful to the radiologist who has not had an opportunity to do special study in this field, or the knowledge that grows out of a wide experience. The chapter will be of equal value to the experienced obstetrician who has not made a practice of employing roentgen study in his cases. Such doctors should slowly turn the pages of this book, study the illustrations, and read the captions. Roentgen pelvimetry is a tool to be employed by the physician for the good of both mother and child. With its continued use, the obstetrician and the roentgenologist, as the author points out, will recognize that pregnant women will fall roughly into three categories, those who obviously will have dystocia, those who will be borderline, and those with ample shape and measurements having no obvious dystocia. This information accurately obtained, and not guessed at, is invaluable.

Snow also points out the danger of mental deficiency occurring in a child, not through any defect in the genes, but because of cerebral trauma encountered in the passage of the head through a contracted birth canal, when proper preparation is not made for handling difficult cases.

Chapter II discusses briefly the essential points of other well-known methods of pelvimetry, followed by a description of the Snow method. Line drawings accompanying the text are most helpful, and instruction for employment of the technic are explicit. The employment of a special rule devised by Snow and his coworkers enables the roentgenologist to have a report in about 5 minutes once the details are mastered.

The chapter headings in many cases indicate both the scope and the broad perspective of the monograph. Chapter III, for example, is entitled "Pelvic Architecture." Here we find that in place of the elaborate overlapping types into which the maternal pelvis is commonly classfied, categories simplified to the point that one is concerned only with those structural relationships that bear a direct relation to the causes of dystocia. Chapters IV, V, and VI deal respectively with unusual occiput presentations, the principal factors that influence the course of labor, and presentations that depart from the usual type. Chapter VII treats of the roentgen study of the fetus, including an interesting and helpful discussion of fetal malformation that can be seen in the film.

Snow has made a particular contribution to the roentgen study of pregnancy by his method of studying the soft parts, especially the placenta. An entire chapter is devoted to the diagnosis of placenta previa by x-ray. The last quarter of the book deals with roentgenology in gynecology, including a chapter on uterosalpingography.

The final chapter is especially significant in that it deals with the recovery of tissue from x-radiation. There is still considerable concern over the employment of roentgen ray technic for diagnostic purposes in pregnancy, and rightly so. Those physicians who employ diagnostic roentgenology not as specialists all too often are unaware of the dangers inherent in the modality which they use so lightly. On the other hand, experienced workers are apt to be unusually concerned about the danger and are not aware of the latest studies proving that the dangers may be kept within the limits of safety. Studies made with an ionization chamber actually in the vagina reveal that the usual four-film pregnancy study will deliver about 5 roentgens into the uterus. Authorities deem this amount safe within a wide margin.

The illustrations in the text are numerous and as satisfactory as it is possible to make them. And they are definitely helpful to the individual perfecting himself in this method. Each chapter carries its own set of references, ample for detailed study but not padded. There is a very workable index.

The monograph is a highly practicable one and those who have the first edition will find this revision commends itself. The text is dedicated "to the betterment of mankind," a goal not too high, since the volume makes available skill and knowledge that basically is preventive medicine of a high order. This reviewer is convinced that the day will come when failure to do roentgen study of the primipara when possible will be considered a violation of the tenets of good medical care.

GASTROINTESTINAL X-RAY DIAGNOSIS. By Max Ritvo, M.D., Assistant Professor of Radiology, Harvard Medical School; Instructor in Radiology, Tufts Medical School; Director, Department of Radiology, Boston City Hospital; Associate in Radiology, Beth Israel Hospital, Boston, Mass., and I. A. Shauffer, M.D., Instructor in Radiology, Harvard Medical School; Instructor in Radiology, Tufts Medical School; Visiting Radiologist, Boston City Hospital. Cloth. Pp. 838, with illustrations. Price $20.00. Lea & Febiger, Washington Square, Philadelphia 6, 1952.

There are many texts on gastrointestinal x-ray now in print. Those published within the last 3 to 5 years are uniformly good; a few of them are excellent. The doctor who is aware of this multiplicity might well ask, why another monograph in a field limited in its demands and apparently well supplied? The question deserves an answer when another large and necessarily expensive book is presented for review.

The roentgenologist who has continued to grow in the stature of his specialty and the resident-in-training, the two individuals for whom such a book is primarily intended, will welcome this addition to a literature that is only apparently overburdened. In the first place, radiology in both its diagnostic and therapeutic aspects is medicine's most rapidly developing specialty. And this text incorporates its latest technics. But it is not so much the fact that many books do not possess the newer technics that renders them inadequate as it is a matter of their approach. The day is past when roentgenology is primarily a technic. True, the roentgenologist must know technical methods and their proper employment by which he obtains certain data. But the data is not in itself the end of the procedure, as may be true of certain clinical laboratory findings. The x-ray section of a clinical institution is not a laboratory; it is in itself a department of medicine. The data obtained by roentgenologic methods becomes a roentgen diagnosis only as it is related by the roentgenologic consultant to the patient studied. And the word "consultant" is used advisedly and with full implications of its richness of meaning. Today's text, therefore, on any phase of roentgenology, constantly keeps this implication in mind. Hence any text on gastrointestinal x-ray diagnosis that is strictly up to date will be of interest and usefulness not only to the roentgenologist but to the gastroenterologist, to the internist, and those general practioners who by necessity must handle such cases. Because such a text covers the entire field of gastroenterology in all of its relational aspects, it will be of equal interest and practical usefulness to the surgegon. This particular volume meets the highest demands of such an inclusive study and as such is warmly commended. Replace the outmoded and inadequate books on the subject now found in many doctor's libraries, and discontinue a good many such texts still being published that have either outlived their usefulness or were never adequate in their scope, and there will be an ample market for such a work as this for both study and reference.

In a great many smaller centers of population there are doctors doing x-ray diagnosis with inadequate training and experience. They belong to no one school of medicine. They are to be encouraged in their attempt to fill a need. But in the case of gastrointestinal x-ray diagnosis their responsibility is a particularly heavy one. To such persons this text, carefully studied, then used for constant reference, would be a real boon, and tremendously increase the validity of their opinion, now too often sheer guesswork.

This monograph is not, therefore, just another text on a certain field of x-ray, of which there are enough. It is a volume of wide appeal and usefulness beyond the special field which it covers so adequately. Its authors are radiologic consultants within the full meaning of that term and they have built their text accordingly.

In the introduction the authors point out that gastroenterology was once based solely on empiricism. With advent of roentgen methods of examination an area of uncertainty was transformed into certainty. The "stomach specialist" passed out of the picture. The internist, the roentgenologist, and the surgeon constitute a trio that makes preventive medicine a reality in gastroenterology.

Chapter I is particularly distinctive, devoted as it is to "general considerations" of the subject, in reality it constitutes a philosophy of the methods of study. It also incorporates a brief history of this phase of x-ray study, which, as is true of medical history of any type, gives meaning and continuity to procedure.

Of special interest is a portion of Chapter I entitled "The Fast Radiological Visceral Survey," by which the entire studies can be completed within a single day rather than the 3-day regimen. The authors fully recognize the limitations of a rapid survey method and advise its use only in carefully selected cases. But the authors show that it can be done when necessary.

The text follows the usual anatomic divisions of the gastrointestinal system. Chapter IX deals as completely as available knowledge permits with lesions in the pancreas, spleen, mesentery, omentum, and peritoneum. That portion dealing with acute abdominal conditions is especially valuable. Chapter X is devoted entirely to hernia with a fullness of treatment that is too often presented quite inadequately. Both the surgeon and the roentgenologist will be appreciative of its details.

The film reproductions are of the best and are taken largely from the files of one Boston City Hospital. The index appears entirely satisfactory.

MAN ON HIS NATURE. By Sir Charles Sherrington, O.M. The Gifford Lectures, Edinburgh, 1937-8. Ed. 2. Cloth. Pp. 300, with illustrations. Price $6.00. Cambridge University Press, London and New York, 1951.

To the doctor to whom the art of reading has become a method of illumination and integration, this volume will prove one of permanent value and unceasing delight. To appreciate the full significance of the book one must recall that its author is one of the great creative intellects of our era. Charles Scott Sherrington's monumental contribution to man's knowledge was his work on the physiology of the nervous system, "The Integrative Action of the Nervous System," published in 1906. His death last month at the age of 95, occurred a little less than a year following his revision of the original text of the Gifford Lectures. In the relatively short time since its publication the volume had become a classic. The preface to the second edition states that the theme of the book was to stress "the view that man is a product, like so much else, of the play of natural forces acting on the material and under the conditions past and present obtaining on the surface of our planet." As can be surmised from this brief sentence, this series of Gifford Lectures constitutes a landmark in the history of man's speculation on his nature as it is now seen in the light of natural science. To produce such a work a man must be more than a physiologist and a scientist, he must possess a poet's insight, a philosopher's wisdom, and a literary craftsman's gift of descriptive writing. To the end of his life the author possessed in full abundance all of these tremendous talents.

Natural science has dropped its early mechanistic and materialistic limitations. To Sir Charles, therefore, there was no distinguishing between living and nonliving matter. Matter itself could only be conceived in terms of electrical energy, causation as such had to be discarded, and in the hierarchy of nature there was "no clear lower limit to mind." But this view of man and the world from which he emanated and yet remained a part, lessened no whit man's ethical and moral sense. The final chapter becomes a plea for man's vocation of duty. "We have, because human, an inalienable prerogative of responsibility which we cannot devolve, no, not as once was thought, even upon the stars. We can share it only with each other."

The writer's method of approach to his subject material will prove most interesting to the physician-reader. He begins with an examination of the ideas of Jean Fernel, sixteenth century physician and physiologist, and relates in numerous places the writings of this once great but now little known man to present day knowledge, thereby furnishing a bridge between thinking of that day and the scientific knowledge of today. This treatment of Fernel suggests that the day may come when a scientist with a sufficiently broad background might well assay the writings of Andrew Taylor Still against the comparative backgrounds of the knowledge of his day and the natural science of today.

Sir Charles' own writing is in itself a rich memorial. To test the truth of this let the reader turn to but two excerpts, description of the embryologic development, the structure, and the functions of the human eye for one and of the mosquito and malaria for the other. This latter story has been told many time, but never with such overtones of meaning.

To read this book is to put one's self in the company of one of the greatly endowed minds of the modern age. One arises from such an experience with an elevation of spirit and a sense of beauty that in itself is the beginning of wisdom.

SCIENCE AND HUMANISM. By Erwin Schrödinger, Senior Professor at the Dublin Institute for Advanced Studies. Cloth. Pp. 68, with illustrations. Price $1.75. Cambridge University Press, 32 E. 57th St., New York 22, 1952.

American readers generally became first acquainted with the work of Erwin Schrödinger when his "What is Life?" was published in 1945, a small book in which that distinguished physicist attempted to answer for the biologist the question ever uppermost in the mind of thinking man. This still shorter book might well have been entitled "Who Are We?" Thus the subject matter of the earlier book and this text are closely related and together they constitute a revelation to the layman of the interrelationship between physics, biology, and philosophy. The impact of modern science upon philosophy has become especially significant.

The author picks up in this text a discussion begun the last pages of the earlier book, the problem of determinism and free will. It seems to this reviewer that rather than clarifying that age-old problem as presented in the epilogue of "What Is Life?" he adds to its confusion. The point of contact between physics and free will is not well established. As Sherrington points out in the second edition of "Man on His Nature," reviewed elsewhere in this issue, "If 'free-will' means a series of events in which at some point the succeeding is not conditioned by reaction with the preceding, such an anomaly in the brain's series of events is scientifically unthinkable." But the first section of the text gives a brief but stimulating discussion of the way in which science is a constituent of humanism. Incidentally, "Science as a Constituent of Humanism" which was the title of the four public lectures which constitute the text serves more adequately to indicate the ideas which the author attempts to present than does the shortened book title.

SURGERY OF THE OBLIQUE MUSCLES OF THE EYE. By Walter H. Fink, M.D., Minneapolis, Minnesota. Cloth. Pp. 350, with illustrations. Price $8.75. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1951.

Ophthalmologists today find one of their procedures in a state of flux. Abnormalities of the oblique muscles which formerly were corrected by alteration of the normal recti muscles are now more frequently treated by repair of the defective muscle itself. As this author points out, the former method of correction has, until recently, been the method of choice because the recti muscles are more easily reached and their physiology better understood. The growing tendency to correct the defective muscle itself rather than to compensate for it now necessitates a more thorough knowledge of the development, physiology, and surroundings of the oblique muscles.

As yet no standard technic for oblique muscle surgery has been evolved, but the author presents accurate information with the hope that it may lead to such a procedure. Part I, "Anatomy of the Oblique Muscles," includes chapters on embryology, comparative, microscopic, gross, and surgical anatomy of both the inferior and superior obliques. These chapters are detailed and present the obliques to the surgeon as they are understood by the anatomist. Part II, "Management of Oblique Muscle Defects," covers frequency, etiology, diagnosis, surgical indications, and surgical technics advocated for oblique muscle defects, as well as present surgical technics based on the anatomy of the area.

Completely illustrated and documented, this volume recognizes the transition taking place in eye surgery and presents to the specialist the accumulated information on the subject to the present date.

SPINOZA DICTIONARY. Edited by Dagobert D. Runes. Cloth. Pp. 309. Price $5.00. Philosophical Library, 15 E. 40th St., New York, 1951.

This volume is another in the series of excellent dictionaries issued by the publishers (philosophy, psychology, sociology, et cetera) which have been found useful not only to students in specific fields, but generally.

Spinoza remains one of the great minds of creative thought of the modern era, acting as a liberalizing influence for the past 300 years. He wrote in a period when men who were suspected of thinking outside of acceptable grooves were closely watched, with severe physical torture imposed as the penalty for daring to assert their own ideas. And now the world appears to be entering another such period, not only in countries where regimentation of thought is made a function of the state, but in the United States as well. If that movement, so much more manifest here than is ordinarily conceived, gains in intensity, Americans may well find their intellectual integrity will be bought at the cost of nonexpression, or at the best sub rosa. It is good at this time, therefore, that the ideas of this great classical thinker find expression entirely in his own words.

CURRENT MEDICAL LITERATURE

(Continued from page 588.)

The patients were given subcutaneously a combination of 10 mg. of methadone hydrochloride and 0.4 to 0.5 mg. (1/150 to 1/130 grain) of scopolamine hydrobromide which had previously proved the most satisfactory dosage for producing analgesia-amnesia. Methadone alone is almost purely analgesic, thus the combination with another agent for sedative effect.

Results were recorded on the basis of three requisites of ideal obstetric analgesia-amnesia: (1) relief of suffering, (2) noninterference with the course of labor, and (3) safety of the child.

Sixty-four per cent of the primiparas and 62 per cent of the multiparas were maintained comfortably by methadone and scopolamine during contractions. Eighty-three per cent primiparas and 74 per cent multiparas received adequate sedation between contractions. The patients' own opinions on relief of pain indicated that 47 per cent of the group were completely satisfied, and 35 per cent received moderate relief. Thus 82 to 85 per cent experienced at least moderate relief.

Labor was not unduly prolonged by the administration of methadone and scopolamine in average (10 mg.) therapeutic amounts. Over 83 per cent of the multiparas delivered in less than 8 hours while 72 per cent of the primiparas delivered in less than 12 hours. There were no cases of a depressing influence from the drug.

In a separate study on 21 patients of the effects of methadone on uterine activity patterns, a single subcutaneous dose of 10 mg. methadone had no obvious effect on contraction patterns; a second dose 1 and ½ to 2 hours later temporarily decreased intensity of contractions in a minority of cases, and an intravenous injection of 10 mg. slowed contractions in only 1 of 5 patients. Of 5 patients studied for possible effects of scopolamine which was administered with the methadone, only 1 showed a slowing of uterine activity. Though there are individual reactions, in general, methadone appears to have no effect on labor.

Past reports on methadone noted that it had produced a depressing effect on fetal respiration. However, this study indicated that the role of methadone in causing fetal asphyxia is no greater than that of any other similar drug.

Delivery anesthesia was saddle-block low spinal in 560 cases and inhalation in 440. With the addition of general (inhalation) anesthesia to the methadone and scopolamine analgesia there was "immediate" breathing in 69 per cent of the primiparas' infants and 73 per cent of the multiparas' infants. Time of first fetal breath in the 1,000 cases was in 1 minute or less than 92 per cent of babies born of multiparas and 83 per cent of primiparas' babies under regional anesthesia. Thus it appears that the fetus which is susceptible to hypoxia or which has been subjected to a chronic oxygen deficiency during or before labor should be delivered by local or regional block, rather than with inhalation anesthesia, especially if a narcotic type analgesia also has been used.

As premature babies are particularly affected by pharmacologic narcosis, the use of narcotics and/or barbiturates plus general anesthesia is to be avoided. Even in a healthy term fetus, suffering otherwise relatively minor respiratory depression from labor complications, severe asphyxia may be caused by the anesthesia employed. When fetal anoxia occurs during labor, delivery should be accelerated, without the use of general anesthesia, if possible.

In an analysis of 26 infants delivered with the use of saddle-back anesthesia, and who failed to breathe spontaneously within 5 minutes, apnea was found to be caused largely by narcosis from excessive dosage or poor timing of depressant agents and injury to the fetal head during labor or delivery. The mothers of 19 of the infants had received 10 mg. of methadone within 2 hours before delivery and the other 7 received two 10 mg. doses within 5 hours before delivery. Seventeen of the parturients had also been given 200 mg. of amobarbital sodium within 2 to 6 hours prior to delivery. Thus it was concluded that long-acting barbiturates should be avoided when narcotic analgesia is used.

Only 1 case showed methadone to be the single detectable cause of fetal asphyxia. None of the 9 (4 intrapartum, 5 postnatal) fetal deaths in the 1,000 cases studied was caused by the use of methadone and scopolamine analgesia.

The conclusions reached were that methadone used with scopolamine provides adequate pain relief during labor and constitutes no unusual hazard to the mother or the baby.

THE DON'TS OF SPINAL ANESTHESIA

Current studies indicate that fewer operative complications result from the use of spinal than from general anesthesia. That the method is safe is evident from records of its use during the past 50 years by relatively inexperienced physicians in many cases, with few complications. Since spinal anesthesia is the most satisfactory method for certain operations, public acceptance and approval must be gained by further decreasing the number of operative complications from its use. Bruce M. Anderson, M.D., in the April, 1952, issue of *California Medicine* outlines the psychologic and physiologic *don'ts* to be considered in the selection and use of spinal anesthesia.

From the psychologic viewpoint, if the patient has any fears or prejudices about the method it should not be used. Likewise, the surgeon's objections should be respected if possible. Only in the case where spinal anesthesia is definitely indicated may the wishes of patient and surgeon be overruled. The anesthesiologist's judgment and experience must be the deciding factors and usually will be accepted if explained fully.

Disturbance of the cardiovascular system and disease of the central nervous system constitute the physiologic contraindications to use of spinal anesthesia.

Patients with coronary artery disease, pronounced arteriosclerosis, valvular heart disease, aortitis or severe hypertension should not have spinal anesthesia as the method requires abrupt compensations of the cardiovascular system which are sometimes impossible in the presence of these diseases. However, other aspects of the patient's immediate condition may indicate an exception in favor of spinal anesthesia.

This method should not be used where the hemoglobin content of the blood is 8 gm. or less per 100 cc., as spinal anesthesia enlarges the vascular pool and thus creates a greater area to be supplied with oxygen by the already low hemoglobin. For the same reason, patients in shock should not receive spinal anesthesia.

A general rule to be observed in regard to cardiovascular disease is, don't use spinal anesthesia for any operation above the diaphragm.

In the patient with bowel obstruction, the danger of sudden tension release, causing vascular collapse, or of vomiting and aspiration of gastrointestinal contents also contraindicates spinal anesthesia.

Presence of active central nervous system disease, such as meningitis, multiple sclerosis, progressive muscular dystrophy, herpes zoster, and spinal cord tumor absolutely precludes spinal anesthesia. Spinal column disease, bone infection, and fractured vertebrae also contraindicate use of this method.

As a precaution against blame of the anesthetist or the method, in the event of possible complications, spinal anesthesia should not be used for patients with a history of poliomyelitis or syphilis, although the possibilities of harm are slight.

Obese patients likewise are unsuited to spinal anesthesia.

Technical considerations include careful patient preparation, mental and physical, absolute cleanliness, carefully rinsed needles and inspection of the ampules, swift accurate administration, and assurance that the patient is in a comfortable unstrained position. On the *don't* side, injection should not be made through infected areas, in the presence of paresthesia, when blood is aspirated after the tap, or if pain is out of proportion to the disease.

Spinal anesthesia is a safe and valuable method if employed under proper conditions and with skilled technic. The only after-effects not yet eliminated are headache and localized backache in a small number of cases. Nevertheless it should be remembered that "The primary contraindication to spinal anesthesia is the absence of a spinal anesthetist."

Conventions and Meetings

Announcements

American Osteopathic Association, Fifty-Seventh Annual Convention, Chicago, July 13-17, inclusive. Program Chairman, Roger E. Bennett, Middletown, Ohio.

American College of Osteopathic Internists, annual meeting, Hotel Huntington, Pasadena, Calif., October 14-18. Program Chairman, Neil R. Kitchen, Highland Park, Mich.

American College of Osteopathic Surgeons, annual meeting, Neil House, Columbus, Ohio, October 26-30.

American Osteopathic Academy of Orthopedics, annual meeting, Neil House, Columbus, Ohio, October 26-30. Program Chairman, Warren G. Bradford, Dayton, Ohio.

American Osteopathic College of Radiology, annual meeting, Neil House, Columbus, Ohio, October 26-30. Program Chairman, J. Armande Porias, Newark, N. J.

American Osteopathic Hospital Association, annual meeting, Neil House, Columbus, Ohio, October 26-30.

American Society of Osteopathic Anesthesiologists, annual meeting, Neil House, Columbus, Ohio, October 26-30.

Canada, annual meeting, Fort Garry Hotel, Winnipeg, Manitoba, August 18-20. Program Chairman, Frederick H. Deeks, Winnipeg.

Hawaii, annual meeting, October 9-11. Program Chairman, C. W. Wyman, Honolulu.

Kentucky, annual meeting, Brown Hotel, Louisville, September 24, 25. Program Chairman, Martha Garnett, Louisville.

Michigan, annual meeting, Grand Rapids, September 29-October 2. Program Chairman, William R. Kerr, Romeo.

Missouri, annual meeting, Governor Hotel, Jefferson City, October 6-8. Program Chairman, Clifford L. Steidley, St. Joseph.

New York, annual meeting, Hotel Powers, Rochester, October 10, 11. Program Chairman, Hewett W. Strever, Rochester.

North Carolina, annual meeting, Battery Park Hotel, Asheville, October 24, 25. Program Chairman, Elizabeth E. Smith, Asheville.

Ohio, refresher course, Hotel Carter, Cleveland, October 8, 9. Program Chairman, W. B. Carnegie, Cleveland.

Oklahoma, annual meeting, Hotel Biltmore, Oklahoma City, November 5-7. Program Chairman, Melvin A. Kiesel, Hinton.

Osteopathic College of Ophthalmology and Otorhinolaryngology, annual meeting, Neil House, Columbus, Ohio, October 30 through November 1. Program Chairman, Charles A. Blind, Los Angeles.

Pennsylvania, annual meeting, Penn Harris Hotel, Harrisburg, September 26-28.

Tennessee, annual meeting, New Southern Hotel, Jackson, October 13-15.

Vermont, annual meeting, October 1, 2. Program Chairman, Roy M. Sherburne, St. Johnsbury.

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OFFICIAL AND AFFILIATED ORGANIZATIONS

ARIZONA

State Society

The officers are: President, L. A. Nowlin, Phoenix; president-elect, Van H. Fossler, Tucson; vice president, Richard O. McGill; and secretary-treasurer, Homer E. Allshouse (re-elected), both of Phoenix.

The trustees are: Vernon W. Pierce and Thomas J. Odom, both of Tucson, John Poehner, J. R. Forbes, and Russell Peterson, all of Phoenix.

State Society Auxiliary

The officers are: President, Hazel Towne, Tucson; president-elect, Lily Meyer; vice president, Jean McGill; and secretary-treasurer, Hazel Nowlin, all of Phoenix.

ARKANSAS

State Society

The officers are: President, Edna W. Nies, Blytheville; president-elect, Glenn F. Crawford, Little Rock; vice president, George V. Harris, Fayetteville; and secretary-treasurer, R. M. Packard (re-elected), Jonesboro.

E. M. Sparling, Hot Springs National Park, will serve as statistician.

CALIFORNIA

State Society Auxiliary

The officers are: President, Mrs. Elmer S. Clark, Long Beach; president-

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elect, Mrs. Charles K. Wark, San Diego; recording secretary, Mrs. Loren A. Sutton, Pasadena; corresponding secretary, Mrs. Willis F. Baughman, Compton; and treasurer, Mrs. Preston J. Stack, Los Angeles.

San Jose

The officers are: President, Pearl Oliphant; president-elect, James Stewart, both of Santa Cruz; and secretary-treasurer, Dolce C. Mansfield (re-elected), Palo Alto.

S. Edith Robb and Thomas Ashlock, both of Palo Alto, are trustees.

CONNECTICUT

State Society

The officers are: President, Henry Moskowitz, Stamford; president-elect, John P. Goodridge, Hartford; secretary, Omar C. Latimer, New Milford; and treasurer, Edward Lamb, Hartford.

FLORIDA

State Society

The officers are: President, William E. White, Bradenton; president-elect, James J. McCormick, Miami; first vice president, Paul E. Wilson, Ocala; second vice president, Morton Terry, Miami; and secretary-treasurer, Dominic Raffa (re-elected), Tampa.

The district trustees are: Frederick L. Bush, Pinetta, Harry B. Merner, Jacksonville, Kenneth Steady, Orlando, Robert E. Wilson, Daytona Beach, George Rothmeyer, St. Petersburg, Robert W. Gates, Ft. Lauderdale, W. S. Horn, Palmetto, and Eugene J. Edelman, Miami.

Trustees-at-large are: William J. Furey, Eustis, Edward H. Loest, Miami, Hugh T. Kirkpatrick, Pass-a-Grille Beach, and Ernest B. Decker, Daytona Beach.

GEORGIA

Atlanta

The officers are: President, Fred R. Lowell; vice president, Walter B. Elliott, Jr.; and secretary-treasurer, Bennett Garner, all of Atlanta.

HAWAII

Hawaii Osteopathic Society

The officers are: President, Frank O. Gladding; vice president, C. W. Wyman (re-elected); and secretary-treasurer, J. W. Stella (re-elected), all of Honolulu.

Committee chairmen are: Legislative, Isabelle Morelock and Bernice L. Gier; program, Richard S. Kotomori; publicity, Dr. Gier; Oahu health council, Elizabeth R. Gladding and Charles D. Lake; entertainment, Dr. Wyman; convention, Dr. Wyman and Dr. Frank Gladding; and Chamber of Commerce, Josephine Morelock, all of Honolulu.

IDAHO

State Society

The officers are: President, Arthur S. Cudmore, Boise; president-elect, Harry E. Kale, Grangeville; and secretary-treasurer, Willard C. Dawes (re-elected), Grandview.

Boise Valley

L. D. Anderson, Boise, spoke on "The Value of Professional Group Meetings" at the June 19 meeting. The next meeting was to be held on July 19 in Lowman.

ILLINOIS

State Society Auxiliary

The officers are: President, Mrs. Dale Richardson, Pontiac; president-elect, Mrs. George Marjan; vice president, Mrs. W. F. Strachan, both of Chicago; secretary, Mrs. L. E. Patton, Morton; and treasurer, Mrs. Stanley Adamson (re-elected), Rockford.

Fourth District

The officers are: President, Roberta E. Mies, Pontiac; vice president, Dean E. Sperry, Peoria; and secretary-treasurer, Robert Clark, Chenoa.

Sam W. Axtell, Lexington, will serve as trustee.

Sixth District

The officers are: President, Hugo A. Lindquist, Springfield; and secretary-treasurer, Charles Miller Eaton, Jr., Quincy.

INDIANA

First District

The officers are: President, Randall Bass; vice president, T. M. Lippincott; and secretary-treasurer, Joseph H. Kenney, all of Indianapolis.

Fifth District

X-ray interpretation of the low-back problem was discussed at the June 15 meeting in Brazil. The next meeting is to be held on September 21 at McCormick Creek State Park, Spencer.

IOWA

State Society Auxiliary

The officers are: President, Mrs. J. K. Johnson, Jr., Jefferson; vice president, Mrs. Stuart F. Harkness; secretary, Mrs. B. E. Poundstone, both of

Des Moines; and treasurer, Mrs. I. M. Royer, Woodward.

Polk County

The officers are: President, Wesley H. Blantz; vice president, Fred W. Tente; secretary, Mr. Wendell R. Fuller; and treasurer, Ralph A. Gaudio, all of Des Moines.

KANSAS

Arkansas Valley

The officers are: President, C. E. Hammer, Dodge City; vice president, Ronald L. Brown, Larned; and secretary-treasurer, Frederick J. Farmer, Stafford.

Louis H. Shoraga, Larned, will serve as trustee.

V. R. Cade is program chairman and Vinson W. Gleason is assistant program chairman. Both are from Larned.

Alfred H. Thiemann, Sublette, presented a paper on surgical care at the June 26 meeting in Dodge City.

Mid-Kansas

A special meeting was held in Newton on June 8.

At the meeting in Hutchinson on June 11 problem cases were outlined and discussed by Alfred C. Syler, Hutchinson.

A meeting was scheduled to be held in Florence on July 9.

Sedgwick County

A report of the state convention was discussed at the meeting held on May 12.

Southeast

The officers are: President, W. H. Dunlap, Girard; vice president, Frank M. Stephens, Parsons; and secretary-treasurer, David D. Harbaugh (re-elected), Coffeyville.

S. Riley King, Neodesha, read a paper on allergy at the May 22 meeting in Neodesha.

Southwestern

The officers are: President, J. D. Haynesford, Garden City; vice president, Alfred H. Thiemann, Sublette; and secretary-treasurer, Buford L. Gregory, Larned.

Roy A. Leopold, Garden City, will serve as chairman of the program committee.

A meeting was held in Lakin on May 20.

MAINE

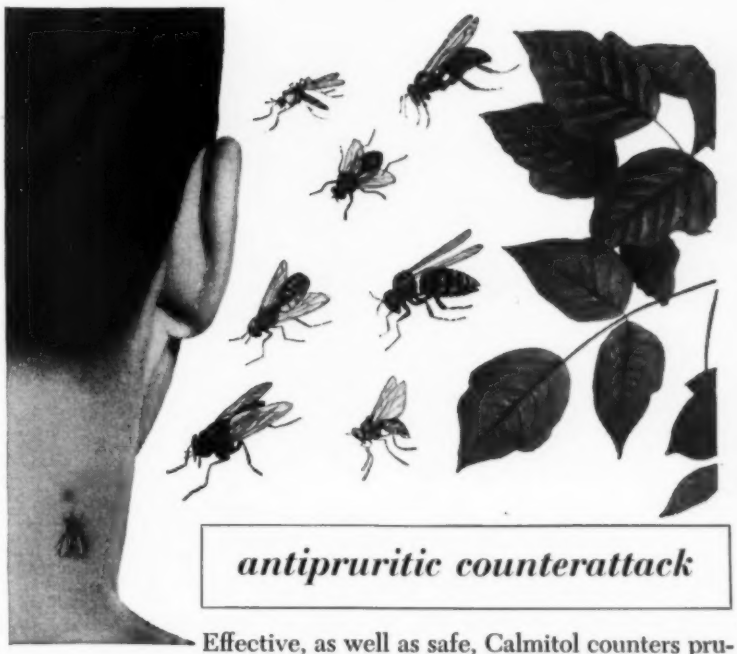
State Society

The program planned for the annual convention in Rockland June 19-21 included: "Anatomic and Manipulative Approach to Foot Problems," Harry J. Petri, Jr., Portland; "The Osteopathic Concept of Disease," Irvin M. Korr, Ph.D., Kirksville, Mo.; "Office Gynecology," Alan J. Snider, York Harbor; and "Diabetes Mellitus," William H. Sherman, Augusta.

MASSACHUSETTS

Mystic Valley

Charles E. Donovan, Salem, described the functions of the State Board of Registration in Medicine of which he is a member at the May meeting in Wellington Circle.



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1. Lubowe, I.I.: New York State Journal of Medicine 50:1743 (July), 1950.

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Southeastern

Speaker at the May 28 meeting in East Dennis was John A. Robertson, Arlington.

MISSOURI

Central

Wallace M. Pearson, Kirksville, spoke on civilian uses of atomic energy at the May 15 meeting in Fulton.

Central Ozark

Representatives of the Carnation Milk Company showed two films, "Preparation of Sterile Formula" and "That Babies May Live," at the June 5 meeting in Crocker.

Northeast

A meeting was held in Bethel on June 12. Earl Laughlin, Jr., Kirksville, conducted a round table discussion based on a case history he presented.

St. Louis

Election of officers was to be held at the June 17 meeting in St. Louis.

NEW HAMPSHIRE

State Society

The following officers were elected at the annual meeting on May 24: President, George W. Draper, Jr., Dover; vice president, Osmond R. Strong, Concord; and secretary-treasurer, Edna C. Waterhouse, North Conway.

NEW MEXICO

State Society

The officers were reported in the July JOURNAL.

The trustees are: H. E. Donovan, Raton, Kenneth E. Warren, Albuquerque, J. Paul Raynolds, Roswell, Paul S. Jones, Las Cruces, Lawrence C. Boat-

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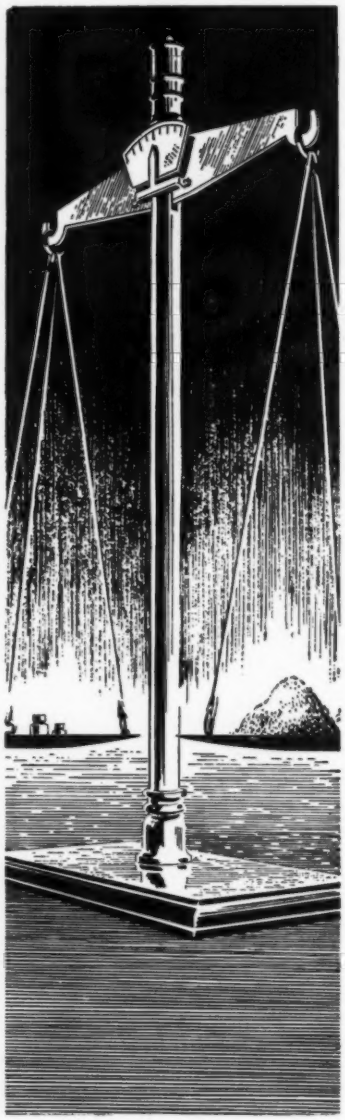

man, Santa Fe, and Charles R. Catron, Gallup.

Committee chairmen are: Publicity, Glenn E. Darrow; legal counsel, Mr. W. P. McAtee; professional liability and insurance, Lloyd W. Mitchell; liaison, P. E. Walley; public relations and placement, Travis W. Ferguson, all of Albuquerque; legislative, Dr. Boatman; ethics and censorship, Dr. Catron; membership, Erwin M. Iverson, Gallup; resolutions, Earl L. Lindsley, Espanola; hospitals and clinics, Dr. Donovan; and Osteopathic Progress Fund and A.O.A. Home Office Building Fund, Charles B. Marsh, Santa Fe.

All of the committee chairmen were reappointed.

NEW YORK

New York City

The officers and members of the board of directors were reported in the June JOURNAL.

The committee chairmen are: Membership, David J. Bachrach; hospitals, J. Marshall Hoag; vocational guidance, Aaron Weintraub; industrial and institutional service, W. Kenneth Riland; public relations, A. Leon Smeyne; publications, Paul H. Zea, Jr., all of New York City; convention program, Alexander Levitt and Stanley Schiowitz; public health, Jacob G. Sheetz, all of Brooklyn; and ethics, Ferdinand C. Gettler, Richmond Hill.

Rochester

The officers are: President, M. Lawrence Elwell; vice president, Myron C. Beal; and secretary-treasurer, C. Dan Jameson.

The trustees are: James H. Reid, Bertha Camp Smith, and Edwin G. Glass.

All of the officers and trustees were re-elected but Dr. Beal and all are from Rochester.

Westchester

William F. Daiber, Philadelphia, presented aspects of blood sugar, cholesterol, and thyroid influences on the heart and circulatory system at the May 28 meeting in Beacon.

Western

The officers are: President, Edgar R. Cofield; vice president, Willfred E. Race, both of Buffalo; secretary, Franklin H. Glassman, Snyder; and treasurer, Herman P. Zaehringer (re-elected), Kenmore.

Guest speaker at the May 21 meeting in Niagara Falls was Charles D. Farrow, Erie, Pa. Dr. Farrow presented several case histories with special emphasis on physical examination.

NORTH DAKOTA

State Society

The officers are: President, Gordon L. Hamilton, Minot; vice president, Naomi Christensen, Grand Forks; and secretary-treasurer, Georgianna Pfeiffer (re-elected), Fargo.

Erwin O. Smith, Wahpeton, is the trustee.

Committee chairmen are: Legislative and public relations, Leonard W. Mills, Grand Forks; public and professional welfare, Harry A. Caufield, Jamestown; vocational guidance, M. J. Hydeman, Bismarck; membership, Dr. Pfeiffer; and program, Dr. Hamilton.

The program planned for the annual convention in Wahpeton on May 17, 18, included: "Structural and Anomaly Evaluation," "Management of Acute Low Back," and a demonstration of technic, Byron E. Laycock, Des Moines, Iowa; "Frozen Shoulder," Clyde V. Johnson, Lennox, S. Dak.; and "Service in the Veterans Administration," Nathan Lipton, Fargo.

OHIO

State Society Auxiliary

The officers are: President, Mrs. D. M. Stingley, Dayton; president-elect, Mrs. H. W. Nolf, Akron; vice president, Mrs. Ralph Land, Columbus; treasurer, Mrs. W. H. Nicholson, Cambridge; recording secretary, Mrs. Robert Southard, Warren; and corresponding secretary, Mrs. Leo Hoersting, Dayton.

Sixth District (Lima)

The officers and trustees were reported in the June JOURNAL.

The committee chairmen are: Membership, William Peirce; vocational guidance, H. R. Stallbohm; public relations, Howard E. Wisterman, all of Lima; and public health, Robert L. Stratton, New Bremen.

Twelfth District (Springfield)

The officers are: President, Paul R. Smith; president-elect, Frank J. Krum-

holtz, both of Springfield; secretary, Charles F. Balmer, Urbana; and treasurer, James F. Minear (re-elected), Springfield.

The trustees are: Chauncey Lawrance, Springfield, Paul Van der Voort, Wilmington, and Dr. Balmer.

Thirteenth District (Columbus)

The officers are: President, Robert Gibson; vice president, Robert E. Gooch; and secretary-treasurer, Mary E. Williams (re-elected), all of Columbus.

The trustees are: Leonard D. Sells, Columbus, Donald E. McBride, Westerville, and Eugene V. Runkle, Etna.

Committee chairmen are: Membership, Dr. Williams; physicians location, Dr. McBride; liaison to auxiliary and public health and welfare, Dr. Gooch; auditing, W. D. Henceroth, Grove City; ethics, Robert L. Thomas; insurance, Ralph S. Licklider; postgraduate and educational affairs, W. Duane Burnard; vocational guidance, William K. Lowry; legislation, James O. Watson; industrial and institutional service, Harold E. Clybourne; and correspondent to "Buckeye Osteopathic Physician," Donald W. Hendrickson, all of Columbus.

OKLAHOMA

Eastern

The following officers were elected at the meeting on May 22: President, Ernest T. Ross, Okmulgee; vice president, G. D. Youngblood, Westville; and secretary-treasurer, Vernard W. Unruh, Wagoner.

Kay-Osage

The officers are: President, Earl E. Stock, Pawhuska; vice president, Thomas W. Hamill, Fairfax; and secretary-treasurer, D. A. Shaffer, Ponca City.

A meeting was held in Ponca City on June 19.

Northeastern

Speakers at the May 26 meeting in Pryor were: C. G. Ewing, Yale; Percy R. Riemer, Pawnee; and Mr. Walter L. Gray, Oklahoma City.

Tulsa

The officers are: President, Frank J. Gasperich, Sand Springs; vice president, L. E. Van Valkenburg; and secretary-treasurer, Crafton D. James, both of Tulsa.

Francis M. Funk, Tulsa, will serve as trustee.

OREGON

Portland

The officers are: President, D. H. Schmidt; and secretary-treasurer, Luceo Mossman, both of Portland.

H. W. Merrill, Tigard, will serve as trustee.

PENNSYLVANIA

Fifth District

The officers were reported in the March JOURNAL.

The committee chairmen are: Membership, George B. Bylander; ethics, Charles H. Brimfield; hospitals, K. T. Steigelman; statistics, Roscoe D. Smedley; legislation, William J. Davis, all of York; clinics, Donald R. Harper; convention program, Randal R. Raeuchle; convention arrangements, William Fellows; industrial and institutional service, L. T. Hempt, all of Harrisburg; vocational guidance, George J. Moeschlin; public health, Norman Lazin, both of Lebanon; and public relations, William S. Mahon, New Cumberland.

Seventh District

The officers were reported in the April JOURNAL.

Council representative is Alexander J. Lyons, Grove City.

Committee chairmen are: Membership, Amedeo A. Agresti; ethics, Owen W. Short; hospitals and clinics, O. O. Wentling; convention program, Lloyd R. Bashaw, all of Erie; statistics, Wendell E. Mook; convention arrangements, Roy J. McDowell, both of Sharon; legislation, D. W. Hamilton, Des Moines; vocational guidance, Harry W. Nicklas, Evans City; public health, Nicholas J. Mischenko, Emlenton; industrial and institutional service, Edmund B. Buckalaw, Girard; and public relations, Paul L. Raub, Greenville.

SOUTH CAROLINA

State Society

The officers are; President, B. F. Landrum, Florence; vice president, Emma B. Hale, Spartanburg; and secretary-treasurer, Nancy A. Hoselton, Columbia. All of the officers were re-elected.

The committee chairmen are: Legislation, E. W. Pratt, Charleston; ethics, Hallie H. Stubblefield, Greenville; convention arrangements, T. C. Lucas; convention program and publicity, Dr. Hoselton; membership, M. VerMelle Huggins, all of Columbia.

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The program presented at the annual convention in Columbia on May 28 included the following talks: "Lesions of the Sacroiliac Joints," "The Intervertebral Disk," "Cervical Maladjustments as Cause for Headaches," and several demonstration sessions.

SOUTH DAKOTA

State Society

The officers are: President, J. J. Markine, Elkton; vice president, G. G. Redfield, Rapid City; and secretary-treasurer, Earl W. Hewlett (re-elected), Sioux Falls.

The trustees are; R. S. Scoville and H. W. Allen, both of Mitchell, Calvin S. Schad, Roscoe, and L. H. Eske, Groton.

TEXAS

Tarrant County

The officers are: President, C. E. Dickey; vice president, Jack H. Woodrow; and secretary-treasurer, Raymond D. Fisher, all of Fort Worth.

The committee chairmen are: Membership, Dr. Fisher; hospitals, Charles L. Curry; ethics, Roy G. Russell; program, M. Virginia Poole Ellis; legislation, L. Griffin Ballard; public health, John C. Baker; public relations, Catherine K. Carlton; and disaster relief, L. H. McAnally, all of Fort Worth.

WEST VIRGINIA

State Society

The officers are: President, Roland P. Sharp, Mullens; president elect, Theodore L. Sharpe, Martinsburg; vice president, Donald C. Newell, Oak Hill: and secretary-treasurer, Guy E. Morris (re-elected), Clarksburg.

The trustees are: Harwood James, Beckley, Joseph B. C. Bartram, Glenville, Roy W. Eshenaur, Point Pleasant, William H. Carr, Bluefield, Walter B. Goff, Dunbar, and R. H. DeWitt, Parkersburg.

WISCONSIN

State Society Auxiliary

The officers are; President, Mrs. Janet Mittelstadt, Marshfield; vice president, Mrs. Jean Wagner, Milwaukee; secretary, Mrs. Jessie Meyers, Kingston; and treasurer, Mrs. Lorna Knowlton, Beaver Dam.

Fox River Valley

The officers are: President, Paul A. Allen, Waupan; vice president, Guy E. Wiley, Oshkosh; and secretary-treasurer, Robert W. Johnson, Appleton.

The committee chairmen are: Membership, D. A. Farnum, Sheboygan; ethics, A. V. Mattern; legislation and public relations, L. D. Thompson, both of Green Bay; hospitals and clinics, Lawrence A. Dennis, Bonduel; vocational guidance, Ross W. Parish, Manitowoc; public health, Dr. Wiley; industrial and institutional service, H. Charles Hagmann, Sturgeon Bay; radio, A. W. Muttart, Neenah; and speaker's bureau, R. B. Hammond, Appleton.

Madison

The officers are: President, Edward L. Parsons, Watertown; vice president, O. W. Lorch, Fort Atkinson; and secretary-treasurer, D. Beryl Mack (re-elected), Madison.

Milwaukee

The officers are: President, James S. Crane; vice president, Irving J. Ansfield, both of Milwaukee; and secretary-treasurer, Richard W. Anderson, Cudahy.

Northwest

The officers are: President, Frederick Thornton, LaCrosse; and secretary-treasurer, Wilfred W. Mittelstadt, Marshfield.

SPECIAL AND SPECIALTY GROUPS

AMERICAN COLLEGE OF OSTEOPATHIC SURGEONS

The officers and members of the board of governors were listed in the January JOURNAL.

Members of the executive committee are: Charles L. Ballinger, Toledo, Ohio, Lucius B. Faires and J. Gordon Hatfield, both of Los Angeles, Orel F. Martin, Coral Gables, Fla., John P. Schwartz, Des Moines, Iowa, and James O. Watson, Columbus, Ohio.

MISSOURI OSTEOPATHIC OBSTETRICAL AND GYNECOLOGICAL SOCIETY

The officers are: President, Fred R. Clark, Wheaton; vice president, J. L. Cornelius, Edina; and secretary-treasurer, Homer F. Matz, Ash Grove.

The trustees are: Lawrence E. Giffen, Jefferson City, and Edward W. Lake, Potosi.

OHIO SOCIETY OF OSTEOPATHIC OBSTETRICIANS AND GYNECOLOGISTS

The officers elected at the organizational meeting are: President, Homer R. Sprague, Lakewood; vice president, L. S. Shaffer, Columbus; and secretary-treasurer, C. A. Purdum, Cleveland.

State and National Boards

ALBERTA

Examinations in September. Address G. B. Taylor, Acting Registrar, Office of the Registrar, University of Alberta, Edmonton.

ARIZONA

Basic science examinations September 16, at the University of Arizona, Tucson. Applications must be completed 2 weeks in advance. Address Herbert D. Rhodes, Ph.D., secretary-treasurer, Basic Science Board, University of Arizona, Tucson.

COLORADO

Professional examinations in October. Applications must be filed 30 days in advance. Address Miss Beulah H. Hudgens, executive secretary, State Board of Medical Examiners, 831 Republic Building, Denver 2.

Basic science examinations September 10, 11, Lecture Room, second floor, YMCA Building, 16th and Lincoln Streets, Denver. Applications must be filed by August 27. Address Esther B. Starks, D.O., secretary, Basic Science Board, 1459 Ogden St., Denver 18.

CONNECTICUT

Professional examinations November 11. Address H. Wesley Gorham, D.O., secretary, Osteopathic Examining Board, 520 West Avenue, Norwalk.

Basic science examinations October 11 at Yale University, New Haven. Applications must be completed 2 weeks in advance. Address Miss M. G. Reynolds, executive assistant, State Board of Healing Arts, 110 Whitney Ave., New Haven 10.

DISTRICT OF COLUMBIA

Professional examinations November 10, 11, and basic science examinations October 20, 21, at George Washington University Medical School, Washington, D. C. Applications for both must be completed by October 1. Address Daniel L. Seckinger, M.D., secretary, Commission on Licensure, Room 4130 Municipal Building, Washington, D. C.

FLORIDA

Professional examinations in November. Applications must be filed in advance. Address Richard S. Berry, D.O., secretary-treasurer, State Board of Osteopathic Medical Examiners, 617-618 Times Building, St. Petersburg 5.

Basic science examinations in November. Applications must be completed 15 days in advance. Address M. W. Emmel, D.V.M., secretary-treasurer, State Board of Examiners in the Basic Sciences, P. O. Box 340, Gainesville.

HAWAII

Examinations October 8. Address Isabelle Morelock, D.O., acting secretary-treasurer, Board of Osteopathic Examiners, 313 Kauikeolani Building, Honolulu 9.

Isabelle Morelock, Honolulu, has been reappointed and Frank O. Gladding, Honolulu, has been appointed to the Board of Osteopathic Examiners of the Territory of Hawaii to serve until May 1955.

IDAHO

Examinations November 13 at Boise. Applications must be completed 15 days before exam. Address Mr. Britt Nedry, director, Bureau of Occupational License, Room 354, State House, Boise.

ILLINOIS

Examinations October 7-9. Applications must be filed 10 days in advance. Address Mr. Charles F. Kervin, Superintendent of Registration, Illinois Department of Registration and Education, Medical Division, State House, Springfield.

IOWA

Basic science examinations August 12 in Des Moines. Address Ben H. Peterson, Ph.D., secretary, Board of Basic Science Examiners, Coe College, Cedar Rapids.

MAINE

Examinations November 11 at the State House, Augusta. Address G. F. Noel, D.O., secretary-treasurer, Board of Osteopathic Examination and Registration, Monument Square, Dover-Foxcroft.

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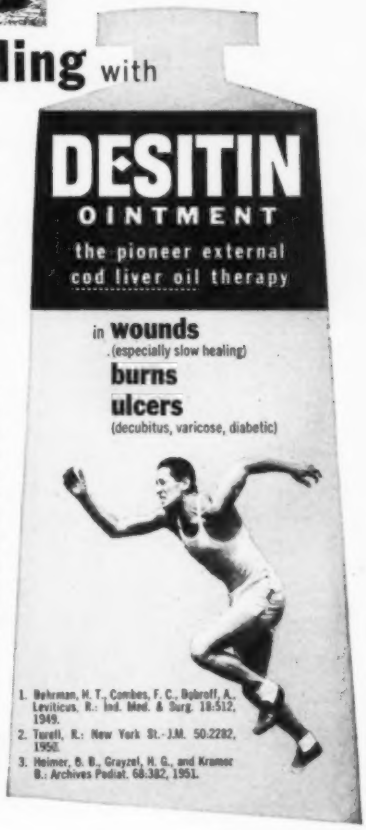
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1. Behrman, H. T., Combes, F. C., Bybroff, A., Leviticus, R.: Ind. Med. & Surg. 18:512, 1949.
2. Turell, R.: New York St. J.M. 50:2282, 1950.
3. Heimer, S. B., Grayzel, H. G., and Kramer B.: Archives Podiat. 68:382, 1951.

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MARYLAND

Examinations in October. Address Walter H. Waugaman, D.O., secretary, State Board of Osteopathic Examiners, 33 S. Centre St., Cumberland.

MASSACHUSETTS

Examinations November 11. Address George L. Schadt, M.D., secretary, Board of Registration in Medicine, State House, Boston 33.

MICHIGAN

Basic science examinations in October. Applications must be filed in advance. Address Mrs. Anne Baker, secretary-treasurer, State Board of Examiners in the Basic Sciences, 423 W. Michigan, Lansing.

MINNESOTA

Professional examinations on September 9. Address Wallace F. Kreighbaum, D.O., secretary, State Board of Osteopathic Examiners, 2933 Hennepin Ave., S., Minneapolis 8.

Basic science examinations in October at Millard Hall, University of Minnesota, Minneapolis. Applications must be filed by September 10. Address Raymond Bieter, M.D., secretary, Board of Examiners in the Basic Sciences, 105 Millard Hall, University of Minnesota, Minneapolis 14.

MONTANA

Examinations in September. Address Asa Willard, D.O., secretary, Board of Osteopathic Examiners, Wilma Bldg., Missoula.

NEBRASKA

Basic science examinations October 7, 8, at the University College of Medicine, Omaha. Applications must be filed 15 days in advance. Address Mr. Husted K. Watson, director, Bureau of Examining Boards, Dept. of Health, Lincoln 9.

NEW HAMPSHIRE

Examinations September 9, in Concord. Address John S. Wheeler, M.D., secretary, Board of Registration in Medicine, State House, Concord.

NEW JERSEY

Examinations October 21. Applications must be completed 20 days in advance. Address E. S. Hallinger, M.D., secretary, Board of Medical Examiners, 28 W. State St., Trenton.

NEW MEXICO

Basic science examinations September 21. Address Mrs. Marguerite Cantrell, secretary, Board of Examiners in the Basic Sciences, P. O. Box 1522, Santa Fe.

NEW YORK

Examinations October 14-17, in New York, Albany, Buffalo, and Syracuse. Applications must be filed 30 days in advance. Address John W. Paige, M.D., chief, Bureau of Professional Examinations and Registrations, 23 S. Pearl St., Albany.

OREGON

Basic science examinations September 6, Room 306, Lincoln High School, 1620 S. W. Park St., Portland, at 8:50 a.m. Applications must be completed by August 20. Address Mr. Charles D. Byrne, Ph.D., secretary, State Board of Higher Education, Eugene.

RHODE ISLAND

Professional examinations October 2, 3, 366 State Office Building, Providence. Applications must be filed in advance. Address Mr. Thomas B. Casey, Administrator of Professional Regulations, 366 State Office Building, Providence.

Basic science examinations November 12, 366 State Office Building, Providence. Applications must be completed by October 30. Address Mr. Thomas B. Casey, Administrator of Professional Regulations, 366 State Office Building, Providence.

SOUTH CAROLINA

Examinations November 18 at Columbia. Applications must be filed 15 days in advance. Address Nancy Hoselton, D.O., president, State Board of Osteopathic Examiners, 1711 Gervais St., Columbia 1.

TENNESSEE

Professional examinations are held on the second Wednesday in February and the last Wednesday in July at Nashville. Address M. E. Coy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland Ave., Jackson.

WISCONSIN

Basic science examinations September 13 at 8 a.m., at the Plankinton House, Milwaukee. Applications must be filed by September 6. Address Professor

William H. Barber, secretary, Board of Examiners in the Basic Sciences, Watson and Scott Sts., Ripon.

WYOMING

Examinations October 6, 7, in Cheyenne. Address Franklin D. Yoder, M.D., secretary, State Board of Medical Examiners, State Capitol, Cheyenne.

REREGISTRATION OF OSTEOPATHIC LICENSES

September 1—Nebraska, $1.00. Address Mr. Oscar P. Humble, director, Bureau of Examining Boards, State Department of Health, Lincoln.

September 1—Ohio, $2.00. Address James O. Watson, D.O., State Medical Board, 114 West Third Ave., Columbus.

October 13—Pennsylvania, $3.00. Address Mrs. Sara H. Longstaff, secretary, Bureau of Professional Licensing, Harrisburg.

November 1—Missouri, $2.00. Address F. C. Hopkins, D.O., secretary-treasurer, State Board of Osteopathic Registration and Examination, 203 South Sixth Street, Hannibal.

EXAMINATION BY NATIONAL BOARD

The National Board of Examiners for Osteopathic Physicians and Surgeons conducts Parts I and II of its examination on the first Thursday and Friday of each May and December at the six approved colleges. Application blanks may be obtained from the secretary or the dean of the college, and the completed application blank, together with a passport photograph and check for the part to be taken, must be in the secretary's office by the November 1 or April 1 preceding examination.

Examinations in Part I consist of anatomy, including histology and embryology; physiology; physiological chemistry; general pathology; and bacteriology, including parasitology and immunology.

Part II consists of examinations in surgery, including applied anatomy, surgical pathology, and surgical specialties; obstetrics and gynecology; pediatrics; neurology and psychiatry; public health, including hygiene; medical jurisprudence; osteopathic principles, therapeutics, including pharmacology and materia medica.

Part III is an oral and practical examination given in Philadelphia, Chicago, Kirksville, and Los Angeles under the supervision of a chief examiner who is a member of the Board and by a panel of associate examiners. Subjects covered in Part III are anatomy; physiology; pathology; osteopathic principles, therapeutics and pharmacology; surgery; ophthalmology and otorhinolaryngology; obstetrics and gynecology; physical and clinical diagnosis; public health and communicable diseases.

Eligibility requirements are as follows: Part I, satisfactory completion of the first 2 years in an approved school of osteopathy; Part II, satisfactory completion of Part I and of the first two quarters or trimesters of the senior year in an approved osteopathic college; Part III, satisfactory completion of Part II and of an internship of 1 year approved by the American Osteopathic Association.

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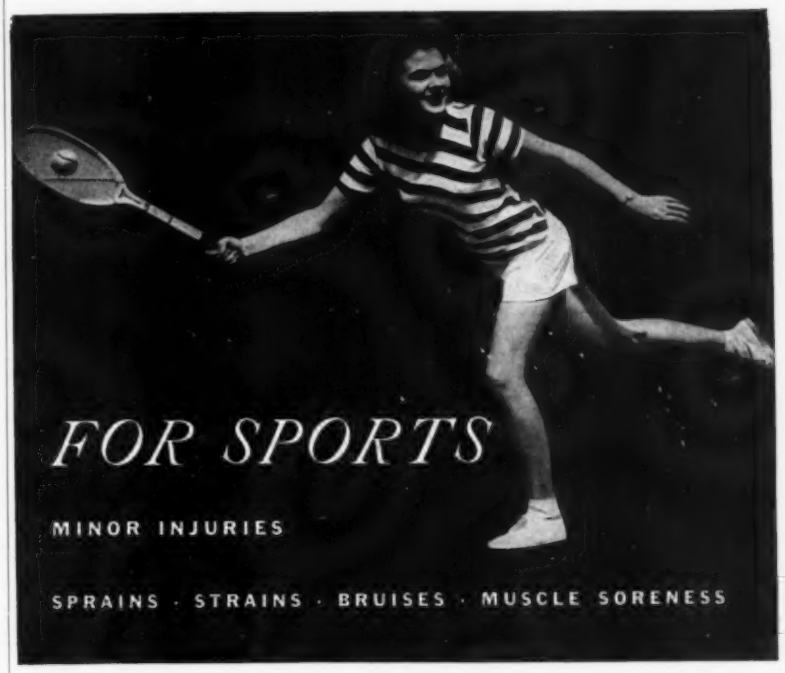

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SEX RATIO IN THE ADULT POPULATION*

The ratio of males to females in the adult population in the United States has been decreasing steadily for about four decades. In 1910, there were 1,097 men for every 1,000 women at ages 21 and over. By 1940 the sexes in our country were numerically balanced; a decade later the men were outnumbered, with 966 of them for every 1,000 women.

The decreasing proportion of men in the population is accounted for by a variety of factors. One has been the changing character of our immigration. The relatively high ratio of men to women in 1910 reflected the preponderance of males among the immigrants flocking to our shores around the turn of the century. However, the effect of this influx has been wearing off as the foreign born have been passing from the scene. Moreover, in the past two decades, most of the immigrants have been females, reversing the situation earlier in our history.

Another factor tending to decrease the sex ratio has been the general aging of the population. More boys than girls

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are born each year, but because of the higher death rate among males their numerical advantage is diminished with each advance in age until women are in the majority past midlife. Consequently, in a population where the proportion of people past middle age is rising, as it is in the United States, there is a definite tendency for the sex ratio to decrease. The ratio of males to females in the adult population in the United States has also been lowered by the war losses and by the stationing of men overseas.

The recent shift in the sex ratio has been nationwide. In the decade 1940-1950, the number of men in relation to women at ages 21 and over decreased in every State but one, namely, Rhode Island. In general, the reduction in the sex ratio has been relatively greatest in the States which had the greatest excess of men. For example, in Nevada the number of men per 1,000 women dropped from 1,377 to 1,171, no less than 15 percent, between 1940 and 1950. In Idaho the corresponding decrease was from 1,172 to 1,086, and in Arizona from 1,114 to 1,021.

It is apparent from these figures that men are still in the majority in some parts of the country. They outnumber women in all of the Western States except Colorado and California, and in some of the Midwestern farming States. The sex ratio is lowest in the eastern part of the country, particularly in the New England and Middle Atlantic States. The Southern States generally have sex ratios only slightly below that for the country as a whole. In the District of Columbia, because of the large clerical force needed by governmental agencies, there were only 855 men for every 1,000 women in 1950, a lower figure than for any State.

The wide geographic differences in the sex ratio have been brought about in large measure by the movement of population within the United States. In the past, more men than women tended to migrate to such areas as the Mountain States and the Far West, where pioneer conditions existed and the comforts of civilization were few. This movement, in turn, decreased the relative number of men in the East. Internal migration still persists and will continue to influence the sex ratio of the various regions in the future, even though the disparity between the number of men and women migrants has been greatly narrowed. The long-term trend is downward in all parts of the country, and the number of States where men are in the majority is rapidly decreasing.

CHANGING PATTERN OF THE AMERICAN POPULATION*

Our country has experienced a marked spurt in population since the beginning of World War II. The census of 1950 showed a decennial increase of about 19,000,000, the rate of growth being 14.5 percent, or fully twice the rate between 1930 and 1940. Furthermore, well over 5,000,000 have been added to our population in the short period since the recent Census, bringing the figure at present to more than 156,500,000. The outlook for continued growth is bright, and we shall probably reach the 200,000,000 mark well before the end of the century.

The acceleration in population growth reflects essentially the general increase in marriages and births. By 1946 the marriage rate in the United States was at an all-time high of 16.4 per 1,000—more than twice the rate in 1932. The birth rate reached a level of 26.6 per 1,000 in 1947, the highest in a quarter of a century. Even more impressive is the record with respect to the number of births. In the past five years more than 18,500,000 babies were born in our country; in 1951 alone the number reached a high mark of 3,833,000.

These facts clearly indicate that the environment in which we live is conducive to family life and that this institution will continue to flourish as the fundamental unit of our society. During the past decade the number of families increased by about 25 percent—from ap-

*This article, based upon a lecture, "Population Trends and Their Impact on Life Insurance," by Dr. Louis I. Dublin, Second Vice-President and Statistician of the Metropolitan Life Insurance Company, delivered at the School of Business Administration, University of Connecticut, on April 16, 1952, is reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Co., May, 1952.

proximately 32,000,000 to 40,000,000. With such large numbers, it is indeed fortunate that the American people have developed various means to safeguard the economic security of the family. Through private Life insurance, 86,000,000 people have accumulated over $250,000,000,000 of protection. Although the United States has only about 7 percent of the world's population, its people own about three quarters of the world's Life insurance. In addition to the coverage which private Life insurance has provided to meet the needs of the individual family, there are the basic benefits accruing from Social Security and National Service Life Insurance. All these forms of protection make the American family the most secure in the world.

Favorable economic conditions are adding further to the financial security of our people. There are now close to 62,000,000 workers in the civilian labor force. Our average annual income is now about $3,300 per family. Never before have earnings been so large, even when adjusted in terms of 1939 dollars. A significant factor in our economy is the increase in the number of women in the labor force, now totalling 19,000,000. Married women, in particular, have swelled the ranks of the working population; many are going back to gainful employment after their children have grown up.

The American family has also benefited greatly from the continued declines in mortality. Our communities, too, have gained immeasurably, for they have been relieved of the heavy burden of supporting large numbers of indigent widows and orphans. Under current mortality conditions, the number of families broken in the course of a year by the death of husband or wife is actually one third less than would have been the case under conditions of only 50 years ago. Due to the marked improvement in mortality at the child-rearing ages, the incidence of orphanhood has been reduced by an even larger proportion. It is, of course, apparent that the financial protection of the family against early widowhood and orphanhood continues to be of the utmost importance. One half of all the deaths among men in our country are at the ages under 65 years; one death out of every five occurs under age 45. More than two thirds of the death claim payments by the Metropolitan Life Insurance Company are to beneficiaries of policyholders who die before reaching age 65. Last year the Company paid out nearly $160,000,000 for policyholders who died between the ages of 45 and 64.

The sex difference in mortality likewise underscores the need for the breadwinner to protect the financial security of his dependents. Thus, for a couple at the same age, the chance that the wife will outlive her husband is 3 in 5; when she is the younger by five years, it is 7 in 10. This situation results in a larger number of widows than widowers, the proportion now being 3 to 1.

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The age distribution of the population has been undergoing significant changes. As a consequence of the recent rise in the birth rate, the proportion of children under 5 years of age has increased from 8.0 to 10.8 percent of the total population between 1940 and 1950, thereby reversing the trend in evidence since 1860. The percentage of older people has been rising steadily for an even longer time. In 1950 the proportion at ages 65 and over was 8.2 percent—exactly twice that at the turn of the century.

The recent bumper crop of children and the increasing number of the aged present challenging problems to many communities throughout the country. These problems can be resolved constructively through our great productive capacity, the vitality of our people, and our democratic way of life.

NEW HYGIENE OF AGING PROGRAM

To demonstrate how State and local health departments can help meet the health needs of older people, a hygiene of aging program is being established in the Public Health Service of the Federal Security Agency, Surgeon General Leonard A. Scheele announced June 23.

The program will be operated by the Division of Chronic Disease and Tuberculosis of the Bureau of State Services.

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Dr. Cletus L. Krag, former research assistant of the Division of Gerontology, Washington University School of Medicine, will direct the program.

"The increase in our population of those past 65 years of age—three million in 1900 compared with around 13 million today—will mean that more health services will be needed for older persons," Dr. Scheele said. "Increased emphasis will have to be placed on preventing and alleviating the ills of older adults and on helping them play a more active role in the community."

"Health agencies can do a great deal toward making the later years happier and more productive," he continued. "Many health departments are beginning to recognize this responsibility by offering health guidance for older people."

The purpose of the hygiene of aging program, the Surgeon General indicated, is to advise health departments on the development of these activities. The program is also designed to help health departments consider the needs and problems of the aging group in all their programs.

CHANGES OF ADDRESS AND NEW LOCATIONS

Adickes, Edward J., from Ozone Park, L.I., N. Y., to 332 S. Beverly Drive, Beverly Hills, Calif.
Adler, Sidney, from Grand Rapids, Mich., to 16 Homestead Lane, Roosevelt, N. J.
Andersen, Nicolai W., KC '50; Monroe, Utah.
Andreen, W. Clemens, from 12820 Ward Ave., to Andreen Clinic, 1475 Ford Ave., Wyandotte, Mich.
Applebaum, Samuel A., from 5092 Raymond Ave., to 8730 W. Kingsbury Ave., St. Louis 24, Mo.
Aronson, Edward I., from Elmhurst, L.I., N. Y., to 4 Central Ave., Massapequa, N. Y.
Auten, John M., from Box 451, to Box 635, Ingleside, Texas.
Baker, William F., from 4307 N. E. 28th St., to 4413 River Oaks Blvd., Fort Worth 7, Texas
Bean, Joseph P., from Los Angeles, Calif., to 1828 N. Kingsley Drive, Hollywood 27, Calif.
Beaty, C. Bowden, from 502 W. San Antonio St., to 212 W. Market St., Lockhart, Texas
Becker, Leonard R., from Denver, Colo., to Mountainair Hospital, Mountainair, N. Mex.
Bernheisel, James L., from 1253 W. Market St., to Carlisle Ave. & Manor St., Route 1 Shiloh, York, Pa.
Blum, Margaret B., from 2834 Glendale Blvd., to 4610½ Catalpa St., Los Angeles 32, Calif. (change of name from Margaret J. Bradley)
Boven, Bernard D., from Los Angeles, Calif., to 202 E. Huntington Drive, Monrovia, Calif.
Bridges, George A., from Providence, R. I., to Route 2, Box 740, Pompano Beach, Fla.
Brott, Wilson L., from 111 W. Eighth St., to 115 Franklin St., Traverse City, Mich.
Brower, Gerald J., from 202 Kresge Bldg., to 202 Danigelis Bldg., Muskegon, Mich.
Brown, Robert J., from 1043 Via Wanda, to 2690 Pacific Ave., Long Beach 6, Calif.
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DeBard, Richard M., from Dayton, Ohio, to 39 N. Main St., Centerville, Ohio
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Hays, Robert W., from 212 State Mercantile Bldg., to 203 State Mercantile Bldg., Fort Collins, Colo.
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Judd, Arza Dee from Kirksville, Mo., to Stockport, Iowa.
Kantzler, George W., from 8857 Chamberlain, to 15924 W. Seven Mile Road, Detroit 19, Mich.
Kaplus, Albert, from Milwaukee, Wis., to 1764 Vyse Ave., Bronx 60, N. Y.
Klevansky, Raymond, from Osteopathic Hospital of Philadelphia, to 7906 Eastwick Ave., Philadelphia 42, Pa.
Kraker, Ralph F., from 310 E. Liberty St., to 517 E. Ann St., Ann Arbor, Mich.
Leighton, Dwight W., from Westbrook, Maine, to Lafayette St., Yarmouth, Maine
Leynor, Phillip W., from Newark, N. J., to 856 Grove St., Irvington 11, N. J.
Livingstone, Frank S., from 7283 Natural Bridge Road, to 308 S. Florissant Road, St. Louis 21, Mo.
Long, John W., from Detroit, Mich., to Whitehall, Mich.
Lynch, Russell J., from Dallas, Texas, to 2505 N. Robinson St., Oklahoma City 3, Okla.
Marshak, Rubin, from New York, N. Y., to Flint General Hospital, 765 E. Hamilton Ave., Flint 5, Mich.
Marshall, Robert M., from Portland, Maine, to Phillips, Maine
Matlin, Milton, from Kansas City, Mo., to 525 S. Victory Blvd., Burbank, Calif.
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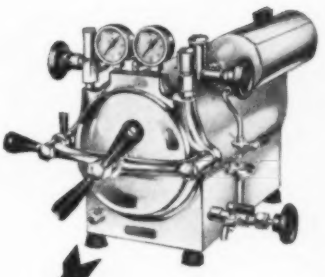

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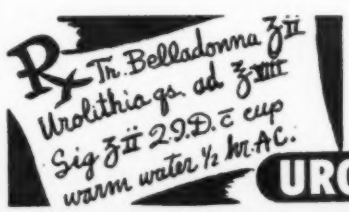

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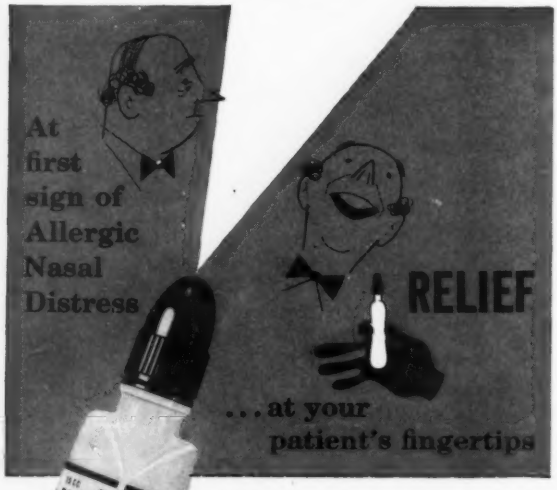

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Sands, George L., Jr., from South Bend, Ind., to Box 417, Bourbon, Ind.
Schaefer, Robert C., from Scotland, S. Dak., to Cadieux General Hospital, 4535 Cadieux Road, Detroit 24, Mich.
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Siegel, Joshua, from Bell Calif., to 3325 S. Main St., Los Angeles 7, Calif.
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Smigelski, Raymond J., from Carson City, Mich., to 311 E. Third St., Richland Center, Wis.
Smith, Elburn A., from Southwest City, Mo., to Welch Hospital, Welch, Okla.
Smith, Robert E., from Box 897, to 205 N. First, Lovington, N. Mex.
Snoke, John W., from York, Pa., to Massachusetts Osteopathic Hospital, 43 Evergreen St., Jamaica Plain, Boston 30, Mass.
Souders, Frank E., from Philadelphia, Pa., to 720-22 Sixth Ave., Des Moines 9, Iowa
Springer, Glenn W., from 2105 Independence Ave., to 5903 E. 13th St., Kansas City 3E, Mo.
Steinberg, Milton S., from Richmond Hill, L.I., N. Y., to 209 Brush Creek Blvd., Kansas City 12, Mo.
Stewart, Robert H., from Garvey, Calif., to 11926 San Bernardino Road, El Monte, Calif.
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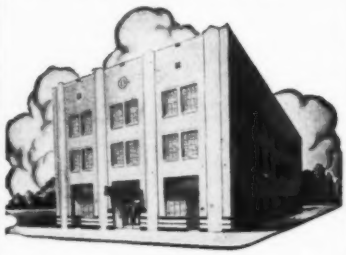

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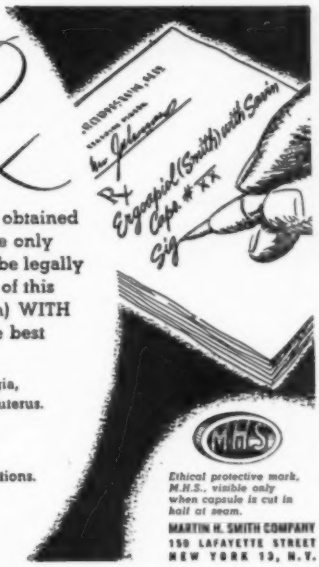

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Books Received

ACADEMY OF APPLIED OSTEOPATHY YEAR BOOK, 1952. Paper. Pp. 161, with illustrations. The Academy of Applied Osteopathy, 1952.

THE KNEE. By Philip Lewin, M.D., F.A.C.S., Professor and Chairman of Department of Bone and Joint Surgery, Northwestern University Medical School; Attending Orthopedic Surgeon, Cook County Hospital; Senior Attending Orthopedic Surgeon, Michael Reese Hospital; Professor of Orthopedic Surgery, Cook County Graduate School of Medicine, Chicago; Formerly Colonel, Medical Corps, A.U.S. Cloth. Pp. 914, with illustrations. Price $16.00. Lea & Febiger, Washington Square, Philadelphia 6, 1952.

PHYSICAL MEDICINE IN GENERAL PRACTICE. Edited by William Bierman, M.D., and Sidney Licht, M.D. Ed. 3. Coth. Pp. 798, with illustrations. Price $12.50. Paul B. Hoeber, Inc., 49 E. 33rd St., New York 16, 1952.

A TEXT-BOOK OF PATHOLOGY. By E. T. Bell, M.D., Emeritus Professor in the University of Minnesota, Minneapolis, Minn. Ed. 7. Cloth. Pp. 1008, with illustrations. Price $12.00. Lea & Febiger, Washington Square, Philadelphia 6, 1952.

THE PRINCIPLES AND METHODS OF PHYSICAL DIAGNOSIS. By Simon S. Leopold, M.D., Associate Professor of Clinical Medicine, School of Medicine and Graduate School of Medicine, University of Pennsylvania; Director of the Teaching of Physical Diagnosis, School of Medicine; Chief of the Thoracic Clinic, Hospital of the University of Pennsylvania. Cloth. Pp. 430, with illustrations. Price $7.50. W. B. Saunders Company, West Washington Square, Philadelphia 6, 1952.

DISEASES OF THE NERVOUS SYSTEM. By F. R. M. Walshe, M.D., D.Sc., F.R.S., Fellow of the Royal College of Physicians of London; Fellow of University College, London; Consulting Physician to University College Hospital, and to the National Hospital for Nervous Diseases, Queen Square. Ed. 7. Pp. 365, with illustrations. Price $5.50. The Williams & Wilkins Co., Mt. Royal & Guilford Aves., Baltimore 2, 1952.

GASTROINTESTINAL X-RAY DIAGNOSIS. By Max Ritvo, M.D., Assistant Professor of Radiology, Harvard Medical School; Instructor in Radiology, Tufts Medical School; Director, Department of Radiology, Boston City Hospital; Associate in Radiology, Beth Israel Hospital, Boston, Mass., and I. A. Shauffer, M.D., Instructor in Radiology, Harvard Medical School; Instructor in Radiology, Tufts Medical School; Visiting Radiologist, Boston City Hospital. Cloth. Pp. 838, with illustrations. Price $20.00. Lea & Febiger, Washington Square, Philadelphia 6, 1952.

BASIC PRINCIPLES OF CANCER PRACTICE. By Anderson Nettleship, M.D., F.C.A.P., Fellow, New York Academy of Medicine; Professor of Pathology, University of Arkansas School of Medicine; Pathologist-in-Chief, University Hospitals, Little Rock. Cloth. Pp. 398, with illustrations. Price $7.00. The Williams & Wilkins Company, Mt. Royal & Guilford Aves., Baltimore 2, 1952.

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George A. Breon & Co. 13
Bristol-Myers Co. ..... Cover II

Ca-Ma-Sil Co. 23
Carnation Co. 6
Chatham Pharmaceuticals, Inc. 36
Ciba Pharmaceutical Products, Inc. ..... Cover IV, 9, 20, 42
Classified Ads 45
Cobbe Phar. 41
Cosmo-Cautery Co. 45

Dartell Laboratories 32
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Devine Bros. 44

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Numotizine, Inc. 39, 42

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